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Journal
OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

Joint Pan American-AVMA Meeting, Kansas City, August 23-27, 1959

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Vol. 134 **May 1, 1959** **No. 9**

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4 An erysipelas vaccine should be suitable for a wide range of conditions. Norden EVA is perfectly safe in any swine age group from suckling pigs to venerable brood sows, and may be used on part of the drove without spreading infection to unvaccinated swine. Bred gilts or pregnant sows may be vaccinated with EVA if accorded reasonable care. The dose is 2 cc, regardless of age or weight.

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EDITORIAL STAFF: W. A. Aitken, Editor in Chief; Donald A. Price, *Associate Editor;* H. E. Kingman, Jr., *Managing Editor;* Eva G. Bailey, *Assistant to the Editors.*

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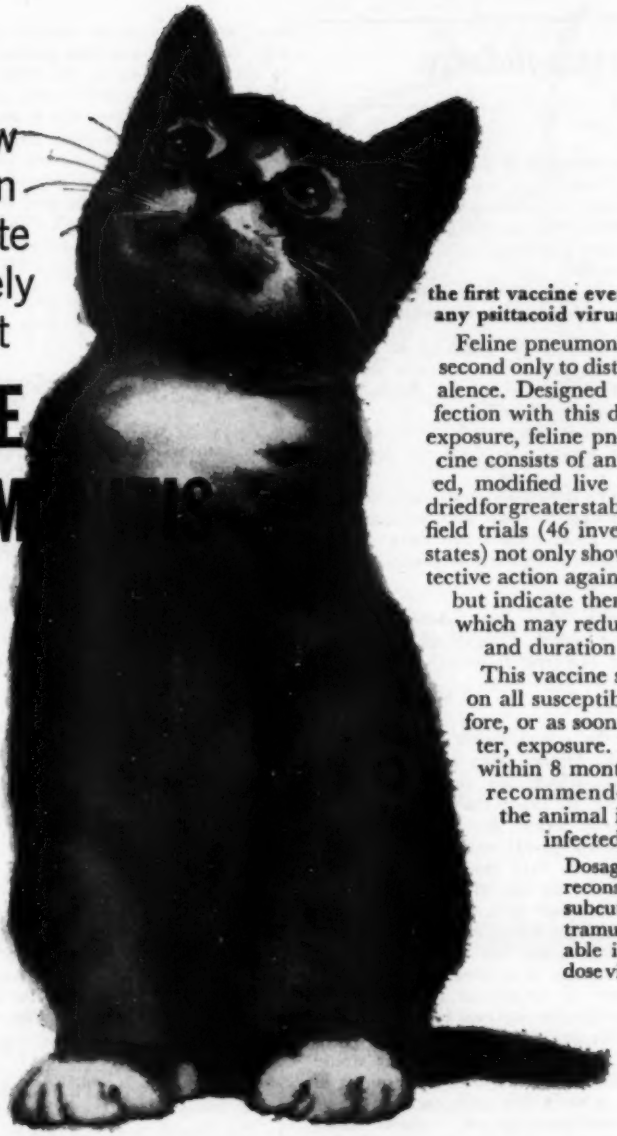

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1462	vaccinated	1254 (86%)	208 (14%)
809	controls	483 (60%)	326 (40%)
field use in noninfected cats			

therapeutic effects also indicated			
No. of cats	Status	No. of cats recovering in 5 days	No. of cats remaining sick after 5 days
611	treated	449 (74%)	162 (26%)
379	controls	66 (17%)	313 (83%)
field use in infected cats			

PITMAN-MOORE COMPANY Division, **ALLIED LABORATORIES, INC.**, Indianapolis, Indiana

Correspondence

Feb. 19, 1959

Sir:

The article on "Myxoma of the Heart in a Dog" in the Feb. 15, 1959, issue was excellent and a valuable contribution to veterinary pathology. . . . Since it was obviously metastatic, shouldn't the neoplasm have been described as a myxosarcoma rather than a myxoma?

s/FRED J. WIGDERSON
Hackensack, N. J.

In reply to the above letter, author S. R. Roberts says: ". . . the term 'myxoma' indicates that the tumor is of mesenchymal origin; i.e., made up of undifferentiated embryonal cells.

There is no essential difference between myxoma and myxosarcoma, except possibly in the degree of differentiation.

Smith and Jones (Veterinary Pathology, Lea and Febiger, 1957) group myxoma and myxosarcoma together, stating 'these tumors are more or less malignant but the term myxoma is generally used in spite of this fact.'"

[Dr. H. A. Smith, head, Department of Veterinary Pathology, A. & M. College of Texas, was asked to comment. His reply follows:]

March 26, 1959

Sir:

Variations in the nomenclature of tumors are by no means new. Instead, they serve to suggest the broad interest which has always existed in neoplasms. Mallory, in 1914 (Principles of Pathologic Histology, by Frank B. Mallory, W. B. Saunders Co., Philadelphia), stated: "The nomenclature of tumors is very unsatisfactory. Most names were applied long ago when much less was known about tumors than now. Consequently, they have become heirlooms which are not easily cast off. . . . The term sarcoma has long been applied to all malignant tumors of a nonepithelial nature. The tendency now is to restrict its use to the four types of rapidly-growing tumors derived from the fibroblast (fibrosarcoma, myxosarcoma, chondrosarcoma and osteosarcoma). Perhaps it would be advisable to retain it in the broader meaning of signifying rapid growth, but such terms as gliosarcoma and rhabdomyosarcoma offend some people strangely."

. . . Mallory was more or less the father of a systematic plan of nomenclature which utilized the suffix "-blastoma" attached to the name of the "type-cell" to give the general specification of the tumor, with "sarcoma" replacing it if the tumor was known to be malignant and both omitted if it was known to be benign (myxoblastoma, myxosarcoma, myxoma, for example). Probably the reason that modern tendencies have been away from such a use of the suffix "-sarcoma" is that the word sarcoma means fundamentally a "fleshy tumor" and many of the types in question really are not "fleshy." At any rate, present usage is inclined to restrict the use of the suffix even more than Mallory did, especially in the case of those types, such as the myxoma, where really benign examples probably do not exist. Thus, the term myxoma is presently accepted in most circles to indicate a "myxoblastoma" of any degree of malignancy, although it still cannot be said that "myxosarcoma" is out of order. After all, "Difference of opinion is what makes the world go around."

s/HILTON A. SMITH
College Station, Texas

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1. Mires, M. H., and Chadwick, R. H.: Vet. News 10:3 (Jan.-Feb.) 1947. 2. Mires, M. H.: J. Am. Vet. M. Ass. 117:49 (July) 1950.

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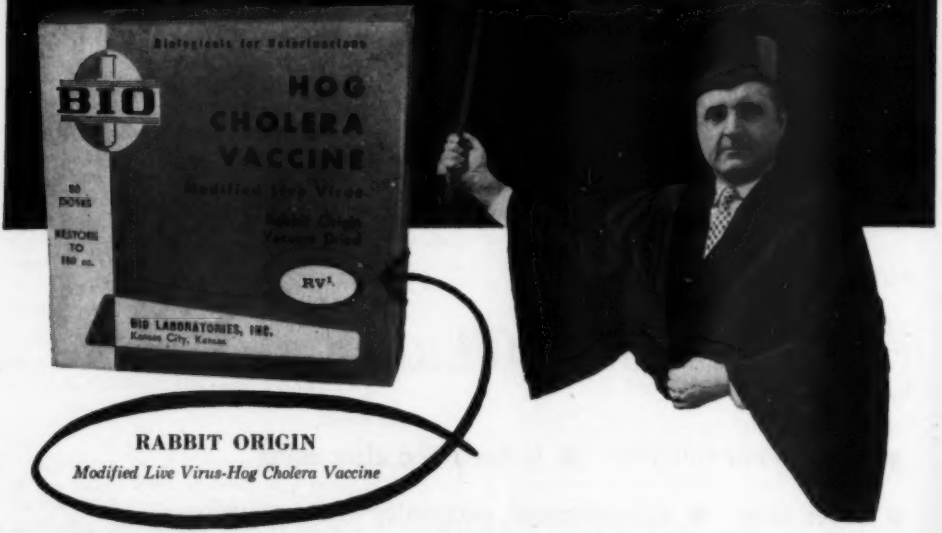

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References: 1. Vigue, R. F.: J.A.V.M.A. 133:326 (Sept. 15) 1958. **2.** Shaw, J. C.: Personal communication. **3.** Pollock, S.: Vet. Med. 54:97 (Feb.) 1959. **4.** Rabin, P. H.: Personal communication. **5.** Hoffer, S. H.: Personal communication. **6.** Weir, H. T., and Hazelrig, J. W.: Personal communication. **7.** Beck, J. W.: Personal communication. **8.** Bull, W. S.: Personal communication. **9.** Fessenden, P. E.: Personal communication. **10.** Lohmeyer, C.: Personal communication.

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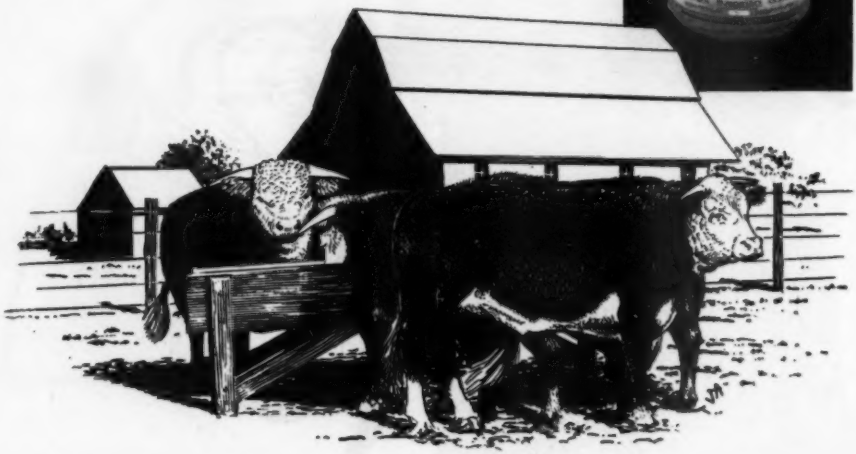

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Washington News

Morgan Report

Dr. Russell H. Morgan, professor of radiology at Johns Hopkins University, testifying before a Joint Congressional Atomic Energy Subcommittee studying radiation hazards, told them **"there is no such thing" as a safe radiation level.** Dr. Morgan is chairman of a special advisory committee on radiation to the Public Health Service. The committee filed a report with **Dr. Leroy Burney,** Surgeon General of U.S.P.H.S. Dr. Burney recently made public the findings and recommendations. Specific recommendations are:

1) Give the Public Health Service, rather than Atomic Energy Commission, primary responsibility for the nation's protection from radiation hazards, and have implementing legislation enacted without delay.

2) Vest as much regulatory responsibility as possible in state and local governments, but with U.S.P.H.S. having supervening authority if and when federal regulation seems more appropriate.

3) Accelerate training of radiation health specialists, radiological technicians, and other needed personnel.

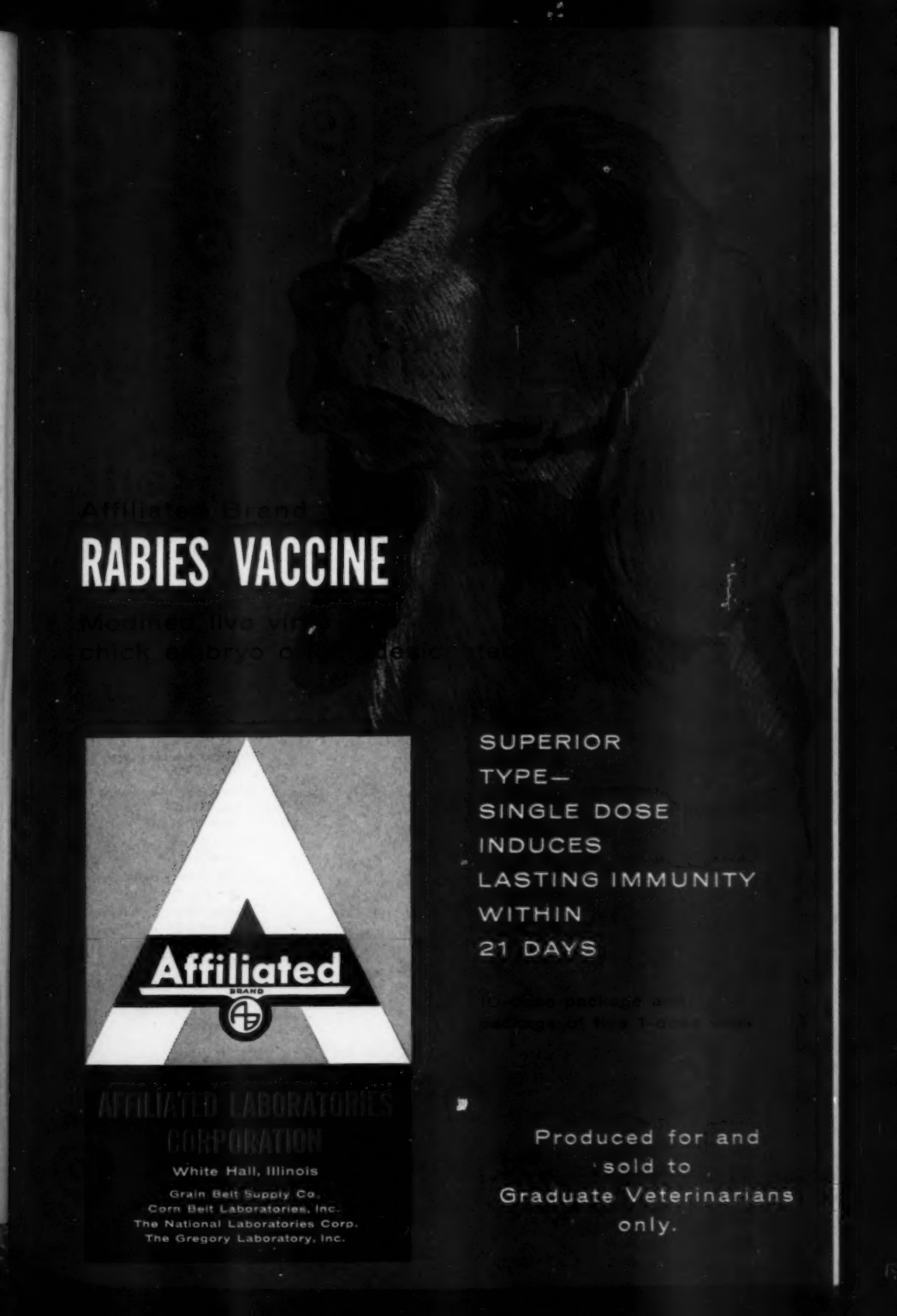
New Items

Chairman John A. McCone, Atomic Energy Commission, informed a Congressional committee that he would not object to the transfer of some of A.E.C.'s radiation protection functions to another government agency.

The seventh edition of the directory of the **American Council of Independent Laboratories** was published recently in which some 74 laboratories in the United States are listed. Services offered by each are stated, and there is a separate index of testing, sampling, and analysis functions listed by categories. Bacteriology, antibiotics, vitamins, nutrition, radioisotopes, and medical chemistry are among them. It is understood that **this directory is available without charge** to company executives in research and development, manufacturing, and merchandising establishments. A copy may be obtained by writing the Executive Secretary of the Council, 4302 East-West Highway, Washington 14, D.C.

Regular Army Appointments

The following have been offered appointment in the Regular Army Veterinary Corps: **Capt. Frank A. Ramsey** (TEX '54), **First Lt. Stanley N. Wampler** (UP '56), and **First Lt. Joseph E. Donovan** (ISC '56).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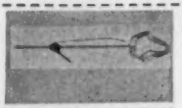

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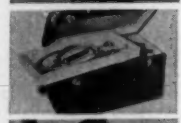

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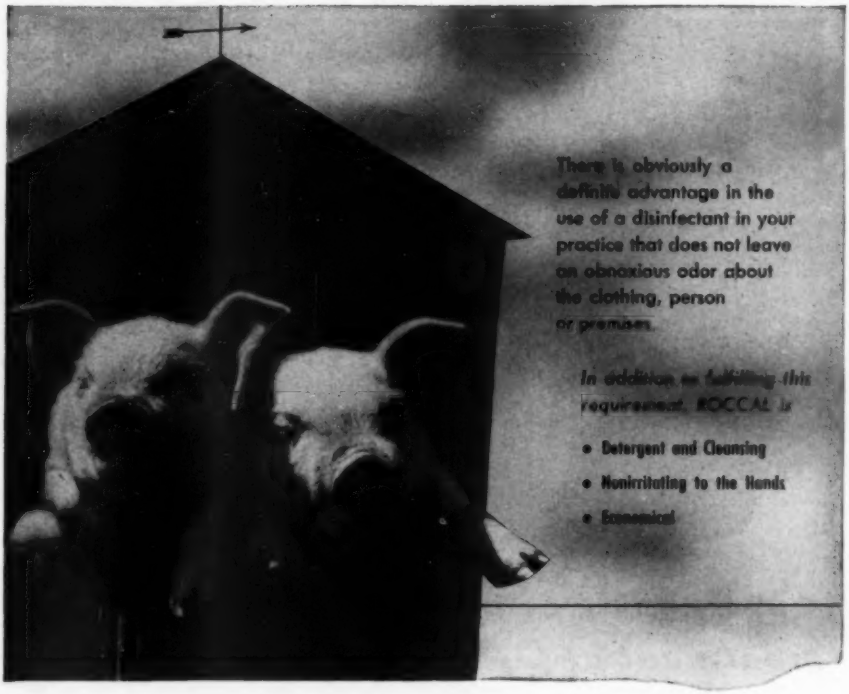
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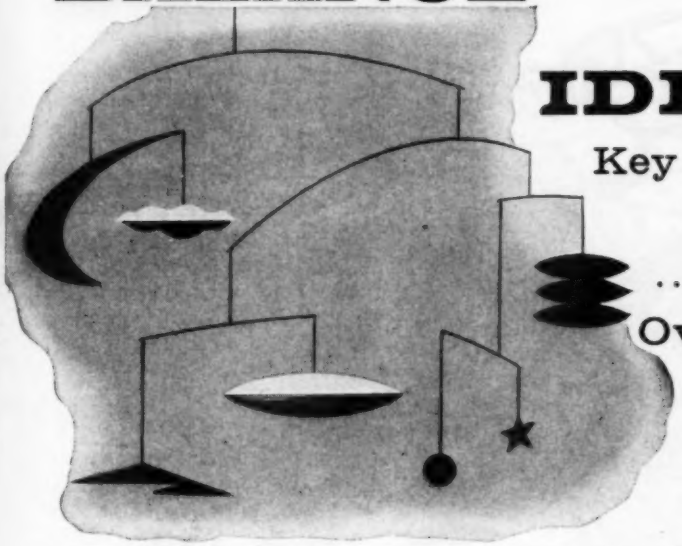

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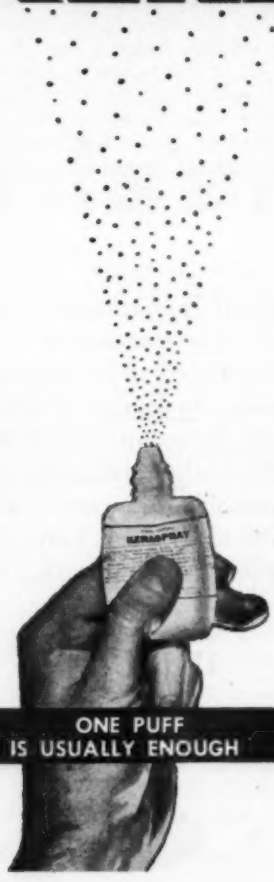

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Traumatic Reticulitis—An Outbreak in a Large Dairy

JOHN P. HUGHES, D.V.M., and PETER C. KENNEDY, D.V.M., Ph.D.

Davis, California

THE VETERINARY problems encountered in large dairy herds where sound management, nutrition, and preventive medicine practices are employed may vary considerably from the problems of everyday practice. Traumatic reticulitis in the individual cow is usually not a major diagnostic problem, but its sudden occurrence in 25 or 30 cows in a well-managed herd can present difficulties in diagnosis. Since certain aspects of this case tended to be misleading, it was considered of interest to present this case report.

History

This was a well-managed dairy, milking about 1,000 cows, mostly Holstein-Friesians. Replacement heifers, as well as most of the essential roughage, mainly alfalfa, were raised on the farm. A change in the feeding program, in which chopped green feed was substituted for hay, had taken place approximately two months prior to our visit on June 21, 1957. The daily ration being fed each cow was 75 lb. of freshly cut alfalfa, 8 to 10 lb. of alfalfa silage, and 4 lb. of dry chopped alfalfa hay. In addition, each cow was given 8 to 10 lb. of commercial grain mix daily in the barn at milking time.

Production and mastitis records were kept and the milkers were careful to report any sickness to the herdsman. This reporting of sickness was stimulated by an arrangement in which the milkers were on a bonus system for milk production, and healthy cows were put into their "strings" to replace sick ones. Sick cows were milked and treated in the hospital barn and were kept separate from the rest of the cows.

The herdsman's history of the disease was as follows. During the last two months in the milking herd, 25 cows (2.5%) had "gone off feed" and there was a marked drop in milk production. One of the first things noticed in some affected cows was that they had been vomiting. Most of them had been stiff and walked "like they had on a pair of tight shoes." Three cows had swollen joints, particularly the hock joints. The temperatures had been 103 to 105 F., but had dropped to 102 by the third day with or without treatment. All of the cows had ceased ruminating when they first became ill.

Treatment had consisted of doses of penicillin or penicillin and streptomycin. A few cows had recovered rapidly and were soon back in the milking line, but most of them had recovered slowly. None had aborted but 4 had died. The urine of a few of the cows had been tested with a ketone test tablet and found negative.

Clinical Observations

The 25 affected cows were brought into the hospital barn for examination. There were no acute new cases in the group, all having been sick for varying periods of one to six weeks.

Temperatures ranged from 101.5 to 102.5 F. Coats were rough and many of these cows were in poor condition. Several showed sunken eyes, dehydration, and arched backs. Auscultation of the lungs and hearts revealed nothing significant, and heart and respiratory rates were normal. Percussion over the xiphoid area failed to elicit pain or a grunt. Rumen motility varied from

From the School of Veterinary Medicine, University of California, Davis.

greatly reduced to normal. One cow had a swollen hock. None of the animals were icteric. Rectal examination revealed no abnormalities.

Udders varied from almost dry to fully lactating glands. The milk appeared normal.

Blood samples were drawn from 4 cows which had been sick for one week (cows 1, 2), two to three weeks (cow 3), and four weeks (cow 4) for hematological studies (table 1). Cow 1 showed a blood picture representative of an early case of traumatic reticulitis. The hematological findings on the other 3 cows were not diagnostically significant.

TABLE 1—Hematological Values in 4 Cows in Varying Stages of Traumatic Reticulitis

Cow No. Stage of illness	1 1 week	2 1 week	3 2-3 weeks	4 4 weeks	Normal values†
r.b.c. per cmm.	7,500,000	5,670,000	7,520,000	5,185,000	5-10 million (7.0)
w.b.c. per cmm.	16,500	7,150	13,100	9,500	4-12 thousand (8.0)
Hemoglobin (Gm./100 cc.)	11.8	9.8	12.1	8.9	8-14 (11.0)
Packed cell volume (%)	36.5	30.0	38.0	26.5	24-48 (38.0)
Buffy coat (%)	1.0	1.0	0.5	1.0	.....
Icteric index (units)	25.0	25.0	5.0	5.0	.....
Band forms (No./100 w.b.c)	.....	.....	.....	0.5	0-2 (1.0)
Neutrophils (No./100 w.b.c.)	60.5	43.5	34.5	33.5	15-45 (25.0)
Lymphocytes (No./100 w.b.c.)	34.0	46.0	43.5	46.0	45-75 (60.0)
Monocytes (No./100 w.b.c.)	3.0	8.5	10.0	14.0	2-7 (5.0)
Eosinophils (No./100 w.b.c.)	2.5	1.5	12.0	6.0	2-20 (9.0)
Basophils (No./100 w.b.c.)	.....	.....	0.5	.....	.....
MCV*	48.6	53.0	50.5	51.0	40-60 (50.0)
MCHC**	32.0	33.0	32.0	33.5	26-34 (30.0)

*MCV-mean corpuscular volume of erythrocytes in cubic microns; **MCHC-mean corpuscular hemoglobin concentration in percentage; †normal values—extreme normal ranges and means for blood values of cattle used at the University of California Veterinary School.

A tentative diagnosis of traumatic reticulitis was made from the herd history and clinical observations. Because of the number of cows involved and the fear of the herdsman that this might be leptospirosis or some more obscure disease, it was suggested that 1 representative affected cow be killed for necropsy. The only significant lesion present was a chronic but still active peritonitis which had resulted from a penetrating wire in the reticulum. The wire had penetrated downward and forward in the reticulum, and the peritonitis had extended to involve the anterior and ventral peritoneal serosa. The reticulum contained numerous additional free pieces of bailing wire.

DISCUSSION

The large number of cows affected within a relatively short time, in a herd which had excellent management and little previous trouble with foreign bodies, had caused the herdsman to suspect some more obscure disease. The alfalfa on the fields from which the green chopped feed was taken had been cut and bailed on previous occasions. Bailing wire probably had been carelessly left in these fields and was picked up by the green feed chopper, which cut the wire into short lengths and distributed it throughout the feed.

This view is supported by the presence of numerous small pieces of bailing wire in the reticulum of the necropsied cow. That the other cows were recovering from traumatic reticulitis is indicated by the clinical findings, past history, and blood picture. The stiffness, vomiting, temperature increases, drop in milk production, anorexia, and lack of rumination are in accord with a history of traumatic reticulitis.

The recovery of cows with acute signs of traumatic reticulitis following antibiotic therapy is consistent with observations of other workers. The fever, drop in milk production, constipation, pain on percussion, atony of the rumen, and anorexia are known to subside within 48 to 72 hours. The penetrating object may not progress beyond the peritoneum and may be permanently walled off, leaving an adhesion between the peritoneal surfaces.

Where a chronic local, but still active, peritonitis remains, as in the necropsied cow, there may be unthriftiness over an extended period, stiffness, and occasionally recurrent attacks of indigestion. However,

the systemic reactions, indicated by increased pulse, temperature, and respiration will have ended. Rumen activity will be almost normal and the appetite much improved. Pain on palpation over the xiphoid will be much less marked and may be absent.

The hemogram of cow 1 was compatible with that of active peritonitis. Cows 3 and 4 had counts within the normal range except for the monocytes, which had an absolute count higher than normal. Cow 2 had counts within normal ranges. She showed 8.5 per cent monocytes, but when an absolute count was calculated,* the monocytes were within a normal range. An absolute monocyte count higher than normal may indicate chronicity. Cows which have adequately walled off the foreign body and show no active peritonitis will have normal blood pictures.

SUMMARY

Traumatic reticulitis involving 25 cows in a group of 1,000 milking cows is reported. This number of cases (2.5%) within two months in a well-managed dairy was more of a problem in diagnosis than an individual case.

The acute signs of the disease usually subsided in three days. A few cows had recovered sufficiently by then to be put back into the milking lines. In most of the cows, the illness ran a more chronic course before recovery. The hematological findings are tabulated.

The large number of cases probably resulted from bailing wire being picked up by the green feed chopper and cut into short lengths for distribution in the feed.

*According to Schalm's method (unpublished data): O. W. Schalm, School of Veterinary Medicine, University of California, Davis.

The Use of Tranquilizers in the Field

In a California trial, 139 calves were taken from their dams and put in pens. Approximately half were allotted to a control group; the remainder were treated with tranquilizing drugs. The treated calves adjusted more readily to the new surroundings; they promptly resumed eating and drinking, did less fence walking and bawling, and were easier to sort, haul, and weigh.

Of 33 ewes given a tranquilizing drug to make them accept orphan lambs, 31 required only one treatment, while 2 required a second treatment.—*P. C. Enge, D.V.M., Davis, Calif., at the 1959 Midwinter Conference of the California V.M.A., Davis.*

Tranquilizing Drugs

Tranquilizing drugs act primarily on the lower brain areas, producing emotional calmness without significantly altering other functions. Drugs having this action have many uses in veterinary practice where restraint of the patient is frequently a problem. They have been used with considerable success in small animal practice to reduce anxiety in the nervous hospitalized patient, prevent car sickness, reduce barking, reduce scratching associated with dermatitis, and to support local anesthetics for minor surgery.

In large animal practice, tranquilizing drugs are helpful in reducing shrinkage in transported animals, in conjunction with local anesthesia for eye surgery, and in "calming" nervous animals so that better physical examination and treatment can be accomplished.—*E. C. Stone, D.V.M., Pullman, Wash., at 1959 Meeting of the Oregon V.M.A. in Portland.*

Lead Poisoning of Unusual Origin

A heifer with a staring coat was dull, grinding her teeth, and making peculiar respiratory noises. Her pupils were dilated, she was blind, and passed some black tarry feces. The owner had treated 16 animals for ringworm with a mixture of red lead and oil of turpentine.

Each was given a calcium solution hypodermically and a laxative of magnesium sulfate. They were drenched with potassium iodide and glucose in milk three times daily. The second heifer was eating normally in a week; the other died in five days. No lesions were found at necropsy, but her kidneys and liver contained large quantities of lead.—*J. O'Driscoll in Irish Vet. J. (Jan., 1959): 13.*

Proper Vacuum for Milking Machines

A vacuum of 50 cm. of mercury resulted in a greater flow of milk and a slightly more rapid milking than did a vacuum of 35 cm. However, it did more damage to the teat canal and resulted in an increase in staphylococcic mastitis.—*Nord. Vet.-med. (March, 1958): 128.*

National Cattle Grub Committee Meets

The National Cattle Grub Committee of Livestock Conservation, Inc., held its second annual meeting in Chicago on Feb. 11-12, 1959. Dr. J. W. Cunkelman (MSC '38), Chicago, is chairman. The following paragraphs are taken from the extensive report of this committee.

EFFECTIVE GRUBICIDES

The two systemic grubicides, Trolene Dow ET 57)* and Co-Ral (Bayer 21/199),** when employed as recommended by the manufacturer and state and federal agencies, are regarded as generally safe for use in grub control. However, the margin of safety is narrow and requires close adherence to directions for use with respect to timing, age, condition of the animal, and dosage rate in order to avoid undue toxic hazard. Signs of mild toxicosis are to be expected among some of the treated animals.

The information available indicates that when these two systemic grubicides are employed as directed, an average of 85 to 90 per cent control of grubs can be expected under practical conditions. The spray (Co-Ral) has shown a wider variation in the degree of control than has the bolus (Trolene).

Rotenone is the only material recommended for grub control in lactating dairy cows.

ECONOMIC IMPLICATIONS

A great amount of interest has been generated in the benefits to accrue to the cattle industry from grub control. Determination of the economic value of grub control at the breeder-producer level presents complex problems in the control of field trials which are most difficult to solve. However, breeders who successfully controlled grubs last year state that the virtual elimination of "gadding" was worth more than the cost of treatment. A limited amount of data has been published showing that grub-free feeders made better gains and feed conversions in the drylot than did the grub-infested controls.

The impact of this information on the differential that a feeder is willing to give for grub-free cattle is yet to be determined. Reports from major markets indicate that buyers of slaughter cattle have shown more discernment in purchases during this grub season than at any time in the past. This has been amply justified by the report on the national cattle grub loss survey at the packing plant level which showed that the carcass and hide damage due to grubs was approximately $13 million in 1958.

The preliminary estimate of a $55 million annual loss at the breeder-feeder levels due to grubs and heel flies is believed by many to be too conservative. When this figure, along with the more factual figures of $13 million annual loss at the packing plant level and $32 million loss by the tanners, is totaled, the result is $100 million annual loss to the cattle industry. The economic merits of grub control are rapidly becoming more clearly defined.

RECOMMENDATIONS

The National Cattle Grub Committee recommends the continued and greatly increased use of Co-Ral and Trolene for grub control in herds and feedlots during the 1959 grub-treating season, with strong emphasis on strict adherence to the instructions for treatment so as to achieve maximum results with minimum side reactions in the treated animals.—*J. W. Cunkelman, D.V.M.*

*Manufactured by the Dow Chemical Co., Midland, Mich.

**Manufactured by the Chemagro Corp., Kansas City, Mo.

Testosterone for a Shy Bull

A 9-month-old Shorthorn bull was severely whipped to force him to leave a paddock where a cow was in estrus; he was then transported to another herd and placed with 10 cows. For the next seven or eight months he showed little interest in cows in heat and no antagonism to a neighbor's bull which came through fences to serve the cows. Since he seemed physically normal, this may have been due to emotional reaction. However, three weeks after he was given a subcutaneous implant of testosterone, calculated to be effective for 90 days, he showed interest in a cow in estrus.

In the next three weeks, his attitude changed completely; he served a cow twice then drove the neighbor's bull back home. He continued to breed satisfactorily for the next two years.—*G. Charles in Vet. Inspector, New South Wales (1958): 69.*

The Role of the United States Army Medical Nutrition Laboratory's Pathology Branch in the Study of Irradiated Foods*

Major SAMUEL W. THOMPSON, V.C., U.S. Army

Denver, Colorado

AS PART of our national program to pursue the peaceful use of atomic energy, the Department of the Army, in 1954, was assigned the task of initiating, supporting, and coordinating a national research program on radiation preservation of food. The Army's role is a logical one, for it is responsible for procuring all subsistence for our Armed Forces and, as such, is the largest single purchaser of subsistence items in this country.

Numerous academic, industrial, and military research groups are participating in this research program. The participation of the U.S. Army Medical Nutrition Laboratory (U.S.A.M.N.L.) in this program is directly related to the responsibility of the Surgeon General of the Army, who has been charged with the task of determining whether irradiated foods may safely be fed to human beings.

The Surgeon General has entered into agreements with numerous academic institutions to conduct various animal feeding studies, using specific food items preserved by irradiation. Chickens, rats, mice, dogs, and monkeys are used as test animals. At first, a group of short-term studies was conducted. These were followed by a series of long-term feeding programs which are currently in progress.

These latter studies are essentially studies on toxicity which are designed to determine the wholesomeness of foods preserved by irradiation along several lines of approach: (1) potential toxicity, (2) nutritional adequacy, and (3) carcinogenicity. These studies were designed through the collaborative efforts of the Food and Drug Administration, Armed Forces Institute of Pathology (A.F.I.P.), and the U.S.A.M.N.L. In addition, the Department of Agriculture and the Department of Health, Education, and Welfare have provided consulting services to the Surgeon General.

Major Thompson is chief, Pathology Branch, Physiology Division, U.S. Army Medical Nutrition Laboratory, Fitzsimons Army Hospital, Denver, Colo.

*Abstract of paper presented to the American College of Veterinary Toxicology, Philadelphia, Pa., Aug. 17, 1958.

One of the requirements of the long-term animal feeding studies is that reproduction will be studied. During the two-year period of the studies using rats, four generations of rats will be raised on diets containing irradiated food components. The studies employing dogs will not embody as many generations. A complete necropsy and microscopic examination will be done on all animals of the first generation in each study and on any and all animals of the subsequent generations that are obviously ill, grossly abnormal, or which develop tumors. These analyses are done by a pathologist retained by each individual contractor in the program.

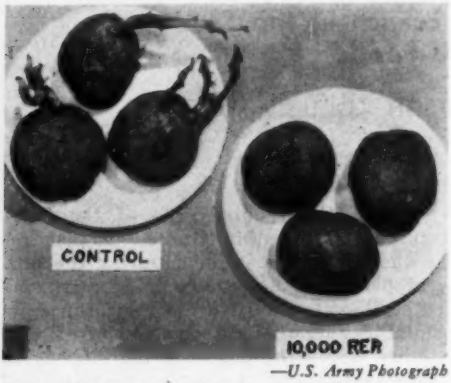
At the conclusion of each investigation, the microscopic slides and pathologist's reports are forwarded to the A.F.I.P. The veterinary section of this institution will review the findings of the contractor's pathologists and catalog all findings on IBM cards for rapid and complete analysis.

The A.F.I.P. will also act as the national repository for all of the histological material obtained in the national study. The scope of this phase of the study is, in itself, staggering. There are several dozen contractors, each with several hundred animals on test, and from most of these animals, 24 tissue sections will be taken. The number of individual reports of pathology will exceed several thousand, and the number of tissue sections to be reviewed will be many tens of thousands.

NEED FOR INVESTIGATION

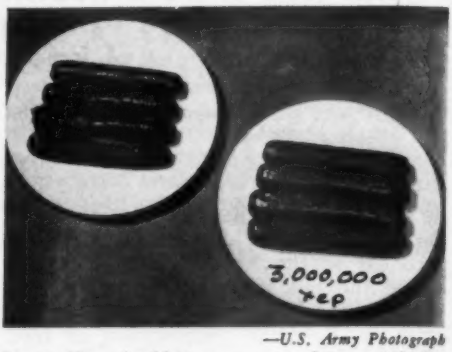
The advantages which can be gained by the preservation of foods by irradiation have been well summarized.[6] By the utilization of wastes from atomic reactors, mixed fission products, or single radioactive elements, it is possible to sterilize foods without the use of heat. Small doses of radiation energy would help conserve supplies of potatoes and onions by retarding sprouting (fig. 1).

Of interest is the fact that it is necessary



—U.S. Army Photograph

Fig. 1—These potatoes have been stored under identical conditions for over a year. One group received an irradiation dose of 10,000 rep. six months after harvest. The sprouting potatoes were not irradiated.



—U.S. Army Photograph

Fig. 2—These frankfurters were stored in special plastic bags at room temperature for one and one half years. Those which appear edible (right) were irradiated at 3,000,000 rep., the others were not irradiated.

to wait for at least six months after harvest before potatoes can be satisfactorily preserved by irradiation.[3] If they are irradiated earlier than this, the process alters the composition of the tubers and they will rot. Six months after harvest, the composition of the tubers has matured, and irradiation will not induce rotting.[3]

Radiation methods, employing higher dosages than used with potatoes, will protect soybeans and cereal products from insect infestations. For example, the radiation dose used for de-infestation of soybeans varies between 40,000 and 80,000 rep.** Meat items such as frankfurters are also readily preserved by irradiation even when stored for long periods at room temperature (fig. 2). Larger radiation dosages are required for the preservation of frankfurters than for potatoes, soybeans, and cereals.

The required radiation dose, to adequately preserve a particular food item, is dependent on the principal cause of natural spoilage of the item (chart 1). If insect de-infestation is the problem, the required radiation dose is low. To prevent spoilage due to nonsporulating bacteria and molds, the required dosage is higher, and to prevent spoilage due to enzymes, extremely high comparative radiation dosages are required.

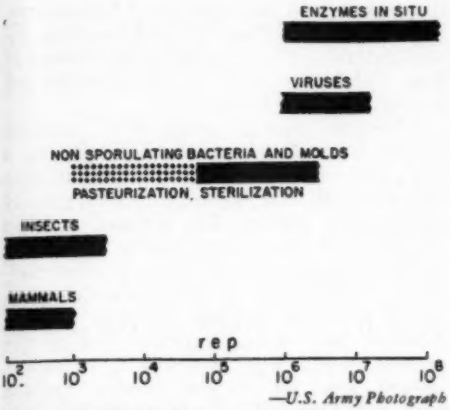
With radiation methods, sterilization of food items can be accomplished with only a small rise in temperature. Thus an irradiated food remains essentially fresh, retains its color, and sustains few of the textural impairments associated with heat sterilization. However, irradiated foods frequently suffer from abnormal taste, which is accentuated at dosage levels higher than 2,000,000 to 3,000,000 rep. Therefore, it is necessary to blanch them rather than use radiation as a means of inactivating enzymes which might otherwise cause enzymatic degenerative changes. Radiation sterilization adversely affects the vitamin content of food items, but vitamin destruction on the whole is no greater in irradiated foods than in heat-processed foods.[1,10,14]

Although irradiation does not make foods radioactive,[7] it could conceivably alter or destroy certain of the chemical components of any given food, particularly the micro-nutrients. Irradiation could make a food more digestible and more nutritious, or it could decrease the nutritive value, predispose to nutritional diseases, toxicity, or carcinogenicity. Until a sufficient quantity of various irradiated foods has been extensively tested for nutritive value, palatability, and potential toxicity, the use of such foods for human consumption cannot be justified; hence, the need for conducting the broad national investigation described earlier.

Feeding Study on Rats

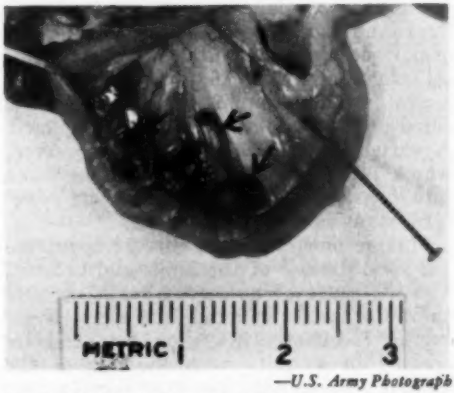
The U.S.A.M.N.L. on a national level coordinates the Surgeon General's phase of the Army's study on the wholesomeness of

**rep.—a roentgen equivalent physical which is the quantity of ionizing radiation of alpha and beta particles, protons and neutrons which, upon absorption in the body tissue, is accompanied by the gain of 93 ergs of energy per gram of tissue.[4]



—U.S. Army Photograph

Chart 1—Radiation dose in rep.** Effective inactivation dosages for certain biological systems.

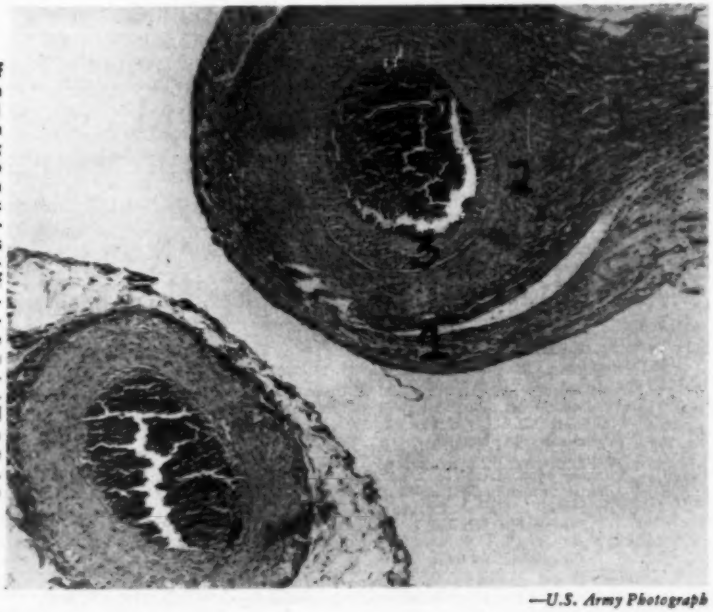


—U.S. Army Photograph

Fig. 3—Nodular lesions of arteritis (arrows) at the attachment of the mesentery to the small intestine of a 700-day-old rat.

foods preserved by irradiation. Besides its role on a national level, the laboratory carries on several internal research programs concerned with the irradiation preservation of foods. One of these studies, which has recently been completed, was a two-year feeding study on rats. Four generations of control and test animals were maintained on a composite diet of nine separate foods. The test diet was fortified with a nonirradiated vitamin and mineral supplement but was essentially a 100 per cent irradiated diet. This study might be thought of as a pilot for the national study. The test diets used in the national study contain only 30 per cent, on a dry weight basis, of irradiated components.

The pathology branch performed the necropsies on all 203 rats used in the U.S.A.M.N.L. studies. A detailed gross ex-



—U.S. Army Photograph

Fig. 4—Typical lesion of arteritis of the arteries in the mesentery of a rat: (1) fibroblastic proliferation in the periarterial adventitia; (2) thickened media due to fibroblastic proliferation which may cause eccentric thickening in some cases—leukocytic infiltration was rarely observed; (3) thickening and hyalinization of the intima. Leukocytic infiltration of the intima occurred occasionally. The tunica elastica is intact; in cases in which it was disrupted the intima was completely hyalinized and focal hyalinization of the media was associated with the disruption of the elastica. H & E stain; 65 mm. Micro tessar.

amination was done on each rat, and over 22 tissue blocks, representative of every organ and tissue, were taken for histological examination. To date, the histopathological examination of approximately one third of these animals has been completed. A variety of diseases has been observed, which interfere with, and must be taken into consideration in planning any long-term study involving rats.

Murine pneumonia,[5] a chronic spontaneous viral disease of the lungs and bronchi, was the cause of numerous deaths in rats on the control and irradiated diets. It occurred frequently in young rats and increased in severity with the age of the animal. Although the two-year survival rate was markedly reduced by this disease, there was no apparent difference in the incidence rate between control and test groups of rats. However, the extent of lung involvement did vary. The disease is difficult to control in most animal colonies, particularly when aged rats are present in the colony.

Chronic arteritis, principally of the branches of the mesenteric artery, was encountered in approximately 10 per cent of the rats in both the control and test groups. This disease has been likened by some investigators[8,9,12,13] to periarteritis nodosa of man. The lesions which we observed did not warrant such an analogy.

Although grossly inapparent arterial lesions were observed histologically in a few rats, the majority of the animals afflicted with this disease exhibited grossly recognizable lesions. The disease could be diagnosed in many cases during the weekly physical examination of the rats, since nodular enlargements of the mesenteric arteries could be palpated through the abdominal wall. When animals died of the disease, death was preceded by a steady weight loss for several weeks. Lesions were not observed in rats under 500 days of age, and the majority of the cases occurred in the 500- to 700-day age range.

At necropsy, the vascular lesions were most frequently discerned as dark beads along the vascular bed of the mesentery, particularly at the point of the attachment of the mesentery to the small intestine (fig. 3). Occasionally, the lesions were extremely minute or appeared simply

TABLE 1—Incidence and Classification of Grossly Apparent Neoplasms Observed in First (L_0) and Second (L_1) Generation Rats Fed Control or Irradiated Diets for Two Years†

	Generation L_0				Generation L_1			
	Malignant		Benign		Malignant		Benign	
Neoplasm	Irrad. diet	Control diet	Irrad. diet	Control diet	Irrad. diet	Control diet	Irrad. diet	Control diet
a) Females:								
Fibroadenoma of mammary gland:								
Single			6	5			3	1
Multiple			3	1				
Cervical polyp			2	1				
Pituitary adenoma			2*					
Parathyroid adenoma							1	1
Endometrial polyp (uterus)							1	
Carcinoma of kidney		1						
Endometrial sarcoma (uterine horn)		1						
Intra-abdominal squamous carcinoma (probably uterine horn)		1						
Cellular sarcoma of salivary gland		1**						
Carcinoma of mammary gland		1			1			
Granulosa-cell tumor (ovary)		1						
Sarcoma of meninges					1**			
Cellular fibro-sarcoma in abdomen					1			
Neoplasms: subtotal	0	6	13	7	3	0	5	2
b) Males:								
Subcutaneous fibrosarcoma	1							
Adenocarcinoma of small bowel		1						
Pinealoma						1		
Adreno-cortical carcinoma					1			
Squamous carcinoma					1			
Pituitary adenoma			1	2				
Adrenal pheochromocytoma			1				1	1
Parathyroid adenoma							1	
Neoplasms: Subtotal	1	1	2	2	2	1	2	1
Neoplasms: subtotal	1	7	15	9	5	1	7	3

*One animal also had cervical polyp; **1 animal also had fibroadenoma of mammary gland.
†Courtesy of Dr. M. S. Read, chief, Irradiated Foods Branch, U.S.A.M.N.L.

as uniform, slightly thickened arteries which felt like wire. More rarely, the arteries in the mesentery were unaffected, and only the hepatic or pancreatic arteries were involved. Infarcts were not observed in tissues supplied by affected arteries.

Microscopically, the most consistent finding was a chronic periarterial inflammatory process of the arteries of the small intestine. With this, there was involvement of all layers of the wall of the artery, which varied in extent from one part of the artery to another, from artery to artery in the same rat, and between rats. A typical diseased artery is shown (fig. 4).

As to the cause of such arterial lesions in the rat, little is known and much is theorized. Various investigators[3,8,9,11,12] have postulated genetic, dietary, endocrinological, immunological, and infectious causes, or combinations of one or more of these factors. To date, the best we can say is that the cause is undetermined. It is a condition which is readily recognizable and is widespread in mature rats. The severity of the lesion and incidence increases with the age of the animal. It is a problem which may appear in and interfere with long-term toxicity or longevity studies in rats.

An interesting array of grossly apparent tumors was encountered in our first (L_0) and second (L_1) generation rats (table 1). A sizable group of grossly inapparent tumors, which can only be detected with the aid of a microscope, was also observed. The study of this latter group of tumors has not been completed.

In the L_0 and L_1 generation females and the L_1 males, more tumors occurred in rats on the irradiated diet. The irradiated diet may favor this increased incidence of tumors, however, the number of animals used was too small to allow for any firm conclusions. When subjected to a statistical analysis, none of this data was significant at the 5 per cent level. The small samples and differences in age between the L_0 and L_1 generations precludes definitive biological and statistical analyses. It is hoped that the eventual integration of the group of grossly inapparent tumors will, at a later date, make it possible for us to draw some firmer conclusions from this data.

Other disease entities were recognized in the rats employed in this study, but analysis as to incidence and significance cannot be made until the histopathological examinations of the tissues from all 203 rats have been completed. So far, no disease entities have been observed which would tend to incriminate the foods preserved by irradiation.

SUMMARY

One of the major projects which the pathology branch supports is related to the national study dealing with the preservation of foods by nuclear irradiation. Extensive pathological studies are being conducted on a variety of tissues from four generations of rats which had been maintained for two years on a composite control or irradiated diet.

The histopathological studies of the first and second generation rats completed to date have not revealed any significant differences in disease incidence between the two diet groups.

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Infectious Canine Hepatitis, with Particular Emphasis on Immunity

Infectious canine hepatitis is an acute viral disease that varies from an inapparent to a severe infection. Important clinical signs of illness are temperature elevation, leukopenia, prolonged bleeding time, hemorrhages and edema, nervous manifestations occasionally, and transient corneal opacity during convalescence. The morbidity is high; the mortality, low.

At necropsy, blood-tinged fluid is found in the abdominal cavity and petechial hemorrhages may be present in many tissues. Other important pathological lesions are observed in the liver, gallbladder, and kidneys. Microscopically, intranuclear inclusion bodies are found in liver and endothelial cells.

During illness, the virus is discharged in all excretions and direct contact is essential for successful transfer of virus. After recovery, virus is eliminated in the urine, thus accounting for maintenance of virus in nature.

It is generally conceded that the immunity resulting from an active infection is solid and long-lasting in most dogs. Simultaneous inoculation, with specific antiserum and virus virulent for dogs, produces a solid immunity, but the carrier status is not eliminated. Virus grown in pig kidney tissue-cultured cells does not produce signs of illness and the dogs are immunized.—*J. H. Gillespie, V.M.D., Ithaca, N.Y., at the Midwinter Conference of the California V.M.A., Davis, Feb. 2, 1959.*

Inhaled Radioactive Particles

Insoluble radioactive particles inhaled by mice remained in the lungs for more than 200 days. Particles of AgI^{131} were apparently soluble in pulmonary tissue and radioiodine reached a peak in the thyroid gland ten hours after inhalation. Radioactive strontium sulfate was rapidly dissolved in the lungs and translocated to the skeleton.

Mice exposed to radioactive particles developed two types of lesions—tumors and sterile pneumonitis. Four kinds of tumors were identified histologically: benign papillary cystadenoma, malignant squamous cell carcinoma, malignant fibrosarcoma, and a malignant undifferentiated tumor. The latent period for development of malignant tumors was at least 200 days.—*Vet. Bull. (Jan., 1959): Item 222.*

Bovine Salmonellosis and Bone Meal

The incidence of human and animal salmonellosis in Australia has reached alarming proportions. It is difficult to eliminate the natural rodent, avian, and arthropod reservoirs, but these may be relatively unimportant.

Bone meal was incriminated as the vehicle for the widespread occurrence of salmonellosis in cattle. The total output of one large bone meal manufacturer was uniformly contaminated with Salmonella. A method of producing safe bone meal is now under investigation.—*D. F. Gray et al. in Austral. Vet. J., 34, (Nov., 1958): 345-350.*

Escherichia Coli—Animal Pathogen

Escherichia coli, long considered capable of changing from nonpathogen to pathogen, is now known to exist in specific serotypes. Many of these serotypes are proved pathogens, whereas other serotypes have been shown to be incapable of causing disease.

Both pathogenic and nonpathogenic serotypes may exist in the intestine at the same time. The pathogenic organisms are believed to be dominant during the manifestations of specific diseases.

The spectrum of pathogenicity appears to be quite broad. The same serotype has been identified in calf scours, lamb septicemia, and bovine vaginitis and infertility. Another serotype has been associated with both mastitis and calf scours. A third serotype, shown to be capable of causing calf scours, has been identified with gut edema and necrotic enteritis in swine, as well as mastitis and abortion in cattle.—*H. W. Dunne, D.V.M., State College, Pa., at the January, 1959, meeting of the Ontario V.A., Toronto.*

Removal of Dog Ticks from Man

Ticks feeding on man may be removed by touching them with the end of a lighted cigarette, by coating them with fingernail polish or petrolatum, or by grasping with forceps and twisting the head and mouth parts free. The tick must not be crushed lest infectious contents enter the wound. Paint the wound with tincture of iodine.—*J.Am.M.A. (Dec. 20, 1958): 2206.*

The Radiographic Appearance of Certain Pathological Conditions of the Canine Uterus

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J. ARCHIBALD, D.V.M., M.V.Sc., M.R.C.V.S.

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UNTIL RECENTLY, it was necessary to resort to an exploratory laparotomy before an accurate diagnosis could be made of anything but the most severe pathological change of the canine uterus. Following the recent development[1] of a convenient technique for radiographically outlining the genital system of the bitch, many diagnoses have been made or confirmed with no more danger to the animal than is associated with barbiturate anesthesia.

The technique consists of the introduction, under anesthesia, of a metal urethral catheter through the cervical canal and into the uterus; contrast medium is then injected into the uterus and a radiograph (hysterogram) obtained. It is the purpose of this paper to record the radiographic appearance of three common and one uncommon pathological changes of the canine uterus.

From the Ontario Veterinary College, Guelph.

CYSTIC OVARIES AND ENDOMETRIAL HYPERPLASIA

A female German Shepherd Dog, 9½ years old, had a vulvar discharge and had attracted male dogs for weeks. She was listless and rapidly lost weight.

Following induction of deep surgical anesthesia, a metal catheter was introduced into the cervical canal with one hand and

Fig. 1—Hysterogram showing cystic ovaries in a bitch. The dye is seen only in those sections of the uterus in which the lumen has not been occluded by endometrial hyperplasia. The longitudinal folds of endometrium appear as longitudinal variations in the density of the dye in some sections. When seen in cross section, the lumen has a stellate appearance.

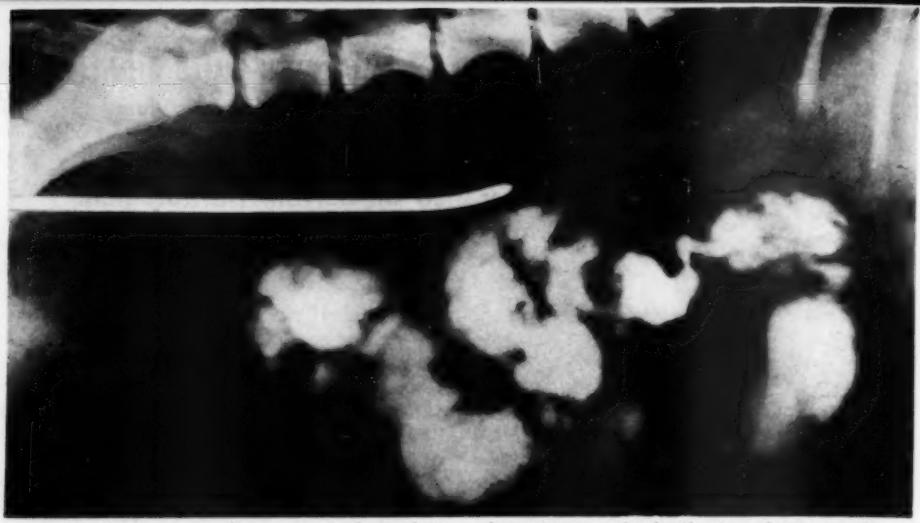

Fig. 2—Hysterogram showing cystic hyperplastic endometritis in a bitch. The irregularities in the outline of the uterus are due to its generalized enlargement, together with cystic hyperplasia of the endometrium (fig. 3). Both horns are outlined, one is seen to lie cranially and the other caudally.

Fig. 3—Cystic hyperplastic endometritis in the uterus of the same dog (see fig. 2). A strip of the wall of both horns has been removed to expose the lumen; the pus content has been washed away.

passed until the tip, which was palpated through the abdominal wall with the other hand, lay just in the body of the uterus. Six cubic centimeters of a 40 per cent aqueous radiopaque solution (Skiodan Sodium*) was slowly injected into the uterus and dorsoventral and lateral radiographs were taken (fig. 1).

Following ovariohysterectomy, five to seven longitudinal folds were observed in the lumen of the uterus. Microscopically, these folds were seen to be due to endometrial hyperplasia, probably stimulated directly, or by way of the pituitary, by the hormonal secretions of the cystic ovaries. Seven days after surgery, the dog was discharged from the clinic in good health.

Radiographic Findings.—The radiographic outline showed a uterus of the length normally seen at estrus. However, the outline of the lumen did not have the uniform diameter of the estrous uterus but varied from the expected normal to zero. The folding of the endometrium observed macroscopically was represented on cross section by a stellate outline, and in other places by longitudinal streaks of varying density.

Cystic Hyperplastic Endometritis

A Dachshund bitch, 3½ years old, became ill four days before admission to the clinic. She had stopped eating and had developed diarrhea and occasionally vomited. At the onset, a veterinarian had treated her with tetracycline hydrochloride

*Skiodan Sodium (Acacia), made by Winthrop Laboratories of Canada Ltd., Windsor, Ont.

and the body temperature had fallen from 105.3 to 102.0 F. When the dog was examined at the college clinic, there was a purulent vaginal discharge. The diarrhea had apparently ceased, but there were signs of dehydration. No abnormalties could be detected on abdominal palpation, and a "plain" radiograph was of no assistance.

The dog was anesthetized and a catheter was inserted via the cervical canal into the uterus; 25 cc. of a 20 per cent aqueous radiopaque solution* was injected during a two-minute period and radiographs were taken (fig. 2). Ovariohysterectomy was then immediately performed and a diagnosis of cystic hyperplastic endometritis (fig. 3) was subsequently made at the pathology laboratory.

The dog was returned to the referring veterinarian six days after surgery.

Radiographic Findings.—The contrast medium had become evenly mixed with the contents of the uterus, giving a clear outline showing grossly dilated horns, with corrugations which were due to the cystic hyperplastic endometrium.

Fig. 4—Hysterogram showing acute metritis superimposed on cystic hyperplastic endometritis in a bitch. Both horns show the corrugations typical of cystic hyperplasia of the endometrium.

ACUTE METRITIS SUPERIMPOSED ON CYSTIC HYPERPLASTIC ENDOMETRITIS

A Chihuahua-Dachshund crossbred bitch, 5 years old, was admitted in a depressed

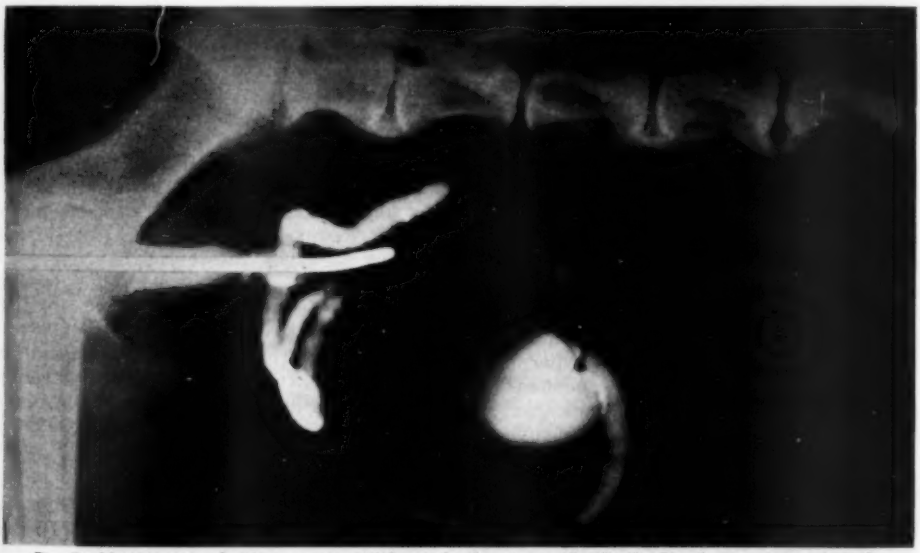

Fig. 5—Hysterogram showing a myometrial cyst in the uterus of a bitch. One horn appears normal; the other bears a large cyst, the presence of which is evidenced by a large dilation of the uterine lumen at that point. The major part of the cyst has displaced the uterus caudally and ventrally.

state and had a profuse bloody vaginal discharge. She had not been bred since purchase four years previously, at which time she was reported to have just aborted. On abdominal palpation, it was noticed that the cervix was enlarged.

The dog was anesthetized and the catheter passed for hysterography. Eight cubic centimeters of the 40 per cent aqueous radiopaque solution was injected into the uterus and lateral and dorsoventral radiographs were made (fig. 4). Ovariohysterectomy was performed, and sections made of the uterine wall for histopathological study showed that cystic hyperplasia was superimposed on acute endometritis (type III in a published[2] classification of the cystic hyperplasia-pyometra complex). The dog was released in excellent condition ten days after surgery.

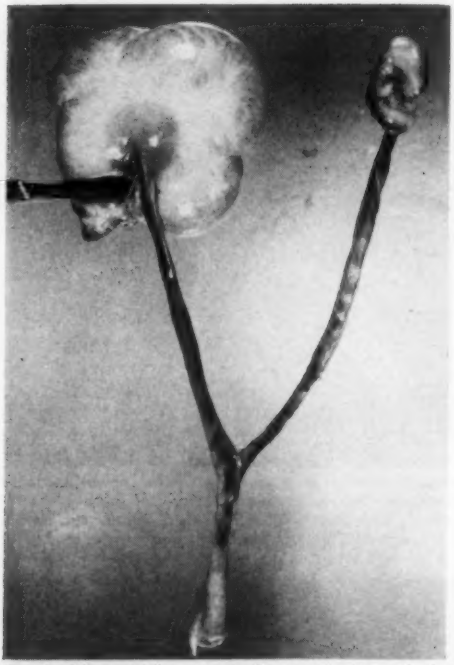

Fig. 6—Myometrial cyst at the termination of the uterine horn (see fig. 5). A normal oviduct is isolated by the scalpel.

Radiographic Findings.—The hysterogram was that of a uterus of normal length but three times the expected diameter. The haziness in outline often associated with an acutely inflamed endometrium was observed in places, with corrugations, due to cystic hyperplastic endometritis, from the cervix to the tip of each horn.

The outline of the uterus, as seen in the hysterogram, is very similar to, and might conceivably have been confused with, either of two other outlines,[1] that due to a generalized but even corrugation of the whole uterus caused by excess dye-pressure or[2] that of the recently postparturient uterus, which is less easily confused.

MYOMETRIAL CYST

A Collie bitch, 8 years old, was admitted to the clinic with a long history of failure to conceive. A large fluctuating mass was palpated in the region of the left ovary, and a tentative diagnosis of hydrosalpinx or myometrial cyst was made from the hysterogram obtained (fig. 5). Ovariohysterectomy was subsequently performed. The cyst, carefully dissected out, was found to lie within the wall of the terminal part of the left horn (fig. 6).

Radiographic Findings.—The hysterogram was that of a normal aged bitch except for a pocket of dye at the tip of the left horn. The body of the uterus and the right horn were pushed caudad and the left horn ventrad by a mass which was apparently rounded. A tentative diagnosis of hydrosalpinx or myometrial cyst was made.

DISCUSSION

These cases serve to illustrate the valuable part that hysterography has to play in the diagnosis of pathological changes in the canine uterus. Success in its use hinges on the maintenance of adequate anesthesia during the manipulation of the catheter through the cervical canal. Because many uterine diseases are acute and there is at present no ideal anesthetic, the use of a combination of drugs is desirable. In our experience, sedation with intramuscular meperidine hydrochloride (Demerol**) followed by intravenous thiamylal sodium (Surital**) at the time of catheterization provides adequate anesthesia with a minimum of danger.

SUMMARY

By case reports, it was shown that the diagnosis of the following canine uterine

**Demerol is made by Winthrop Laboratories, Inc., New York, N.Y.; Surital is made by Parke, Davis & Co., Detroit, Mich.

diseases was aided by radiography (hysterography): endometrial hyperplasia, cystic hyperplastic endometritis, acute metritis superimposed on cystic hyperplastic endometritis, and myometrial cyst.

The dogs were anesthetized and radiopaque solution was injected into their uteri through a metal catheter.

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Intervertebral Disk Fenestration

Of 13 dogs treated by means of intervertebral disk fenestration, 7 had cervical protrusions and recovered in six to 42 days; 4 were paraplegic, 2 being euthanatized four months postoperatively, 1 dying 24 hours after surgery, and 1 after seven days; 2 showed signs of lumbar pain and paresis, 1 dying 24 hours postoperatively, and the other recovering.

It is doubted that the operation effects reduction in the size of the protrusion. It does prevent further extrusion of the nucleus, allows a release of pressure, and reduces the risk of relapses if adjoining disks are also fenestrated. It was chiefly indicated in dogs with signs of pain or limited motor dysfunction or both, and to those which have not responded to a period of conservative treatment.

Because the chance of success is negligible, disk fenestration is not justified as a last resort in dogs chronically affected with severe signs.—*L. C. Vaughan in Brit. Vet. J., 114, (Dec., 1958): 458-463.*

Polyorchidism in a Colt

On May, 1958, a yearling colt, in British Columbia, was castrated, using an emasculator to sever the cords. Four months later, the animal was acting like a stallion and there seemed to be a testicle in the right side of the scrotum. On reoperation, a normal testicle was removed without difficulty although there was some fibrous tissue as a result of the previous operation. Reference was made to a similar case reported in Britain in 1952.—*R. E. Earnshaw in Canad. J. Comp. Med. (Feb., 1959): 66.*

Malignant Melanoma in an Aberdeen Angus Steer

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Malignant melanomas are found in almost all domestic animals, and metastases are common in the lungs, liver, spleen, kidneys, and lymph nodes.[3] In man, certain of these tumors develop from pre-existing areas of pigmentation, nevi or moles, while a large percentage arise spontaneously and are malignant from the start.[1] Since domestic animals seldom if ever have nevi, their malignant melanomas must originate from other sources.[3]

There is a close resemblance between a nevus, sometimes called a melanoma, and the malignant melanoma. The key cell is a melanoblast which develops from the neural crest in the embryo and migrates into the peripheral tissue. The melanoblasts become melanocytes which possess the ability to synthesize melanin, a brown pigment.[1] In the skin, these melanocytes are found in and beneath the epidermis.

The malignant form of this tumor is characterized clinically by rapidity of growth and by metastasis. Microscopically, they show invasion of other structures, increased vascularity, increase in size of cells, hyperchromatic nuclei, numerous mitoses and tumor giant cells, and inflammatory reaction around the tumor.

CASE REPORT

On Nov. 20, 1957, I was requested to examine a 450-lb. Aberdeen Angus steer, 10 months old, with a large protruding black mass immediately behind the right elbow. It was a hard, pedunculated mass about 8 inches in diameter and 12 inches long, and bled readily when punctured with a large needle. The steer was in good physical condition so surgical removal was advised, with the hope that metastasis had not occurred.

Surgery.—The operation was performed under field conditions. The steer was cast on its left side so as to expose the tumor, and the area was prepared for surgery. A perimeter nerve block of the subcutaneous and deep tissue, around and under the tumor, required 40 cc. of 5 per cent local

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anesthetic. After the area was draped, the tumor was grasped and held with a vulsellum forceps. An elliptical incision was made around and approximately 1 inch from the base, and the tumor was excised well into the subcutaneous fascia. Several large blood vessels required ligation with No. 3 chromic catgut suture. The wound was closed with surgical tape and an antibiotic was given intramuscularly.

Examination of the tissue showed it to be a malignant melanoma.[2] This was confirmed at a laboratory.* The steer was turned out on the range immediately and three months later was reported to be in good condition.

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*The author thanks Dr. G. S. Harshfield of South Dakota State College for the findings on the histopathological sections.

Melanosarcoma in a Young Angus Calf

JAMES C. CAREY, D.V.M., and
JOHN W. CAREY, D.V.M.

West Liberty, Iowa

An Aberdeen Angus, 8 weeks old, was presented at our clinic with multiple tumor formation extending from the preputial opening to the scrotum. Palpation of this mass revealed a number of tumors about 6 cm. in diameter.

The calf was anesthetized with pentobarbital sodium (Nembutal*) intravenously. The area was shaved and an incision made over the entire enlargement. The prepuce was involved to such an extent that it was impossible to keep it intact. Therefore, the entire prepuce was removed, tumors included, the penis was amputated in the region of the scrotum, and the calf was castrated. There was no recurrence of tumors. This steer was marketed at 1,000 lb.

Drs. James C. and John W. Carey are general practitioners in West Liberty, Iowa.

*Abbott Laboratories, North Chicago, Ill.

When the tumors were examined, they were found to contain black pasty-like material and were similar to the ones found in gray horses.

We wonder if misplaced embryonic pigment in this black calf had anything to do with these tumors.

Our clinical diagnosis was multiple melanosarcomatosis.

Early Ambulation After Surgery

We provide early ambulation after abdominal surgery. Both dogs and cats are spayed early in the morning and are discharged late in the afternoon of the same day. The owners are given careful and specific instructions for aftercare.

We use an aseptic surgical technique. The abdominal fascia and peritoneum are approximated with one line of plastic sutures, and the skin with another line. Tissue reaction, constipation, inappetence, and sequelae have not been problems; healing is rapid and bandaging is unnecessary. *—L. W. Cottle, Jr., D.V.M., Mobile, Ala., at 1959 Meeting of the Alabama V.M.A. in Dothan.*

Bovine Salpingitis

Of 252 cows, in England, which failed to breed and were studied clinically at necropsy, 40 had bilateral ovarian bursitis, 43 had unilateral bursitis, and another 46 had normal bursae but endosalpingitis severe enough to inhibit the function of one or both uterine tubes. Thus 51.5 per cent had either bursitis or endosalpingitis.

Ascending infection after parturition trauma was probably the most important cause of these conditions. Endosalpingitis was present in 75 per cent of the cows with bilateral, and 58 per cent with unilateral, bursitis. Of the above 129 cows, 63 per cent also had endometritis which probably would have prevented breeding.

Evidence at necropsy indicated that among the cows with bursitis, bilateral function might have been restored in 19 per cent, and unilateral function in an added 7 per cent, by clinical manual rupture of adhesions. However, it seemed doubtful that present clinical methods could have satisfactorily restored tubal patency.—*F. L. M. Dawson in Vet. Rec., 70, (June 14, 1958): 487.*

What Is Your Diagnosis?

Because of the interest in veterinary radiology, a case history and accompanying radiographs depicting a diagnostic problem are usually published in each issue.

Make your diagnosis from the picture below — then turn the page ▶

Figure 1

History.—A female Boston Terrier, 5 years old, was misbred sometime around the middle of November, 1957. The owners were inexperienced at raising pups and paid no special attention to the bitch. About the middle of January, 1958, she whelped 1 live pup unassisted. She nursed and cared for the pup and, during the next three months, the health and condition of both were normal except that the mother had a vaginal discharge. On April 18, 1958, the bitch was examined because of this complaint, and a hard, movable, nodular mass, 10 by 8 by 5 cm., was palpated in the midventral abdominal area. A lateral recumbent radiograph was taken.

Here Is the Diagnosis

(Continued from preceding page)

Diagnosis.—An abdominal mass containing radiopaque material, probably calcified tissue, suspected of being either (1) a mummified fetus or fetuses, (2) dermoid cyst of the ovary, or (3) a radiopaque tumor of the spleen. The history favored the first possibility.

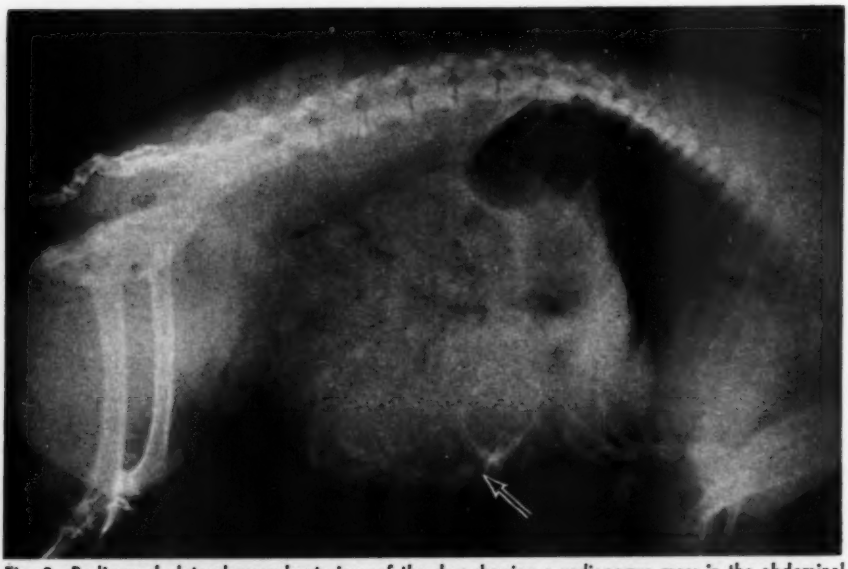

Fig. 2—Radiograph, lateral recumbent view, of the dog showing a radiopaque mass in the abdominal cavity which proved to be 2 mummified fetuses (arrow).

Comment.—At surgery, the mass proved to be 2 mummified fetuses which lay free in the abdominal cavity except for attachment to the omentum which almost encased them. There was little remaining evidence of the fetal membranes, and the shriveled, dehydrated, and somewhat fused fetuses were dark-colored and hardly recognizable as pups. A piece of omentum was also adherent to a horn of the uterus in which there was a scar beneath the adhesions. This was undoubtedly the site where the uterus had ruptured at the time of parturition, allowing the escape of the fetuses and membranes into the abdominal cavity. No major illness of the bitch had been noticed and, except for the examination because of the vaginal discharge, the mass might not have been discovered. The cause of the vaginal discharge was not determined. The uterus and ovaries were removed at the time of surgery, and there was no further trouble.

This report was submitted by Dr. W. H. Crago, Youngstown, Ohio.

Our readers are invited to submit histories, radiographs, and diagnoses of interesting cases which are suitable for publication.

Infection of the Bovine Udder with *Candida Tropicalis*

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HARVEY H. HOYT, D.V.M., Ph.D.; ROGER A. BALL, D.V.M.

St. Paul and Clarks Grove, Minnesota

THE FIRST REPORT of bovine mastitis caused by yeasts appeared in 1934.[9] Since 1948, numerous reports indicate an increase in the incidence of mastitis associated with the presence of fungi.[1,2,5-14]

Outbreaks of mastitis due to unidentified members of the genus Candida have been reported in England and the United States.[11-14] *Candida pelliculosa* was isolated from animals with mastitis in Italy.[5] Several cases of mastitis have been associated with the presence of *Candida albicans*.[2]

The spread of fungus infections of the mammary gland has been associated with intramammary infusion of antibiotics[2,5,6,10,13] and dry storage of teat cup inflations.[11]

CASE REPORT

In December, 1957, all 15 cows in a dairy herd were treated for chronic mastitis in the course of a control program being carried out in a general practice. All quarters were treated because of a high incidence of *Streptococcus agalactiae* infection as determined by the Hotis test. The treatment consisted of 1 million units of procaine penicillin and 1 Gm. of dihydrostreptomycin in 20 ml. of distilled water infused into each quarter. The distilled water, syringes, and infusion tubes had been sterilized by boiling, and separate infusion tubes were used for each quarter.

Six days after treatment, 3 of the cows showed clinical evidence of acute mastitis. These cows were given an intramuscular injection of erythromycin. Microscopic examination of incubated milk samples taken prior to treatment failed to show evidence of microbial growth. Two days later, all of the cows had developed acute mastitis, with varying degrees of severity. Extensive swelling of a spongy consistency was present in the udders of several animals. A gray, viscid secretion was obtained from the affected quarters. The body temperatures of 4 cows ranged from 104 to 107 F. In some cows there was anorexia, lameness, and a drastic decrease in milk production.

Laboratory Diagnosis.—Individual quarter samples from each animal were collected in Hotis tubes and incubated 18 hours at 37 C. A 0.01-ml. sample of milk from each quarter was streaked on one fourth of an agar plate containing 5 per cent defibrinated bovine blood, and 0.01 ml. was streaked on one fourth of a Sabouraud's agar plate. Direct smears of incubated milk were stained with Newman's stain and examined microscopically.

Pure cultures of *Candida tropicalis* were isolated from 45 (75%) of the quarter samples examined, with at least one quarter from each cow being infected. The organism was identified according to the criteria of Conant.[4] No significant bacterial growth was observed on the blood agar.

Clinical Procedure and Results.—All antibiotic therapy was discontinued when the etiological agent was identified. Since udder infections with Candida sp. have been reported to be self-limiting,[13] no other treatment was given.

Within two weeks from the onset of clinical signs, the appearance of the herd, with the exception of 1 cow, was greatly improved, although the causative organism could be isolated from 38 quarters with at least one isolation from each cow in the herd.

One month after the onset, 1 cow was sent to slaughter because of udder involvement and failure to return to normal milk production, and *C. tropicalis* was isolated from 17 quarters of 8 cows. Early in March, 1958, 7 of the remaining 14 cows were sold for a variety of reasons not connected with the mastitis outbreak and 7 young cows were added to the herd. No

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Approved for publication as a scientific journal series article by the director of the Minnesota Agricultural Experiment Station as paper No. 4035.

The authors acknowledge the assistance of Dr. S. G. Bradley, Department of Bacteriology and Immunology, University of Minnesota, in the identification of the organism.

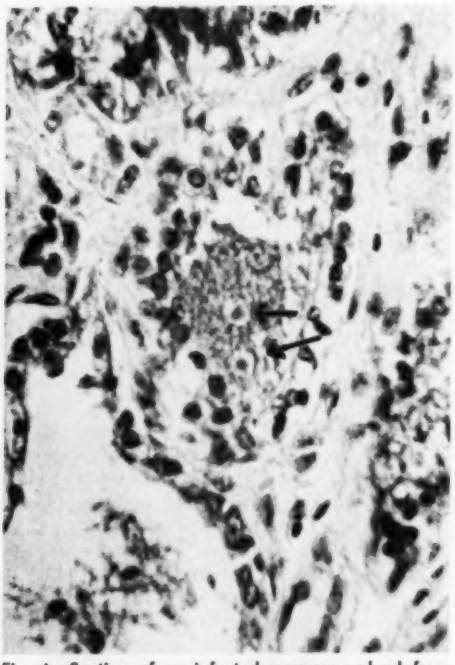

Fig. 1—Section of an infected mammary gland from a cow with mastitis, showing yeastlike organisms in the alveolus (arrows). H & E stain; x 400.

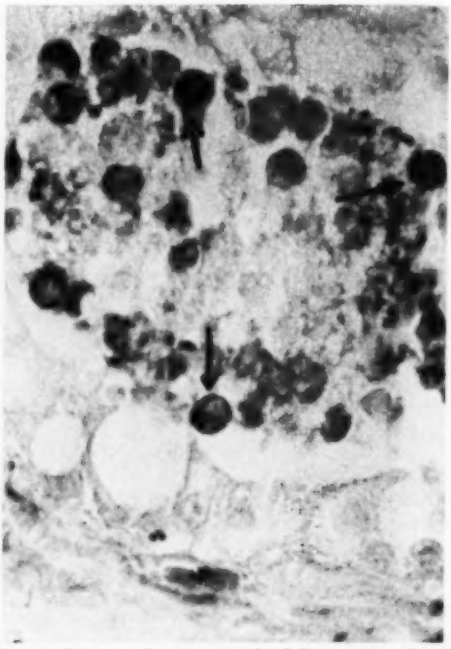

Fig. 2—Section of mammary gland from a cow, showing dark-staining, yeastlike organisms in the alveolus (arrows). The cells lining the alveolus are stained faintly. Gram-Weigert stain; x 920.

effort was made to separate these cows from the original cows. One month later, 4 of the original 7 cows were still shedding *C. tropicalis* in the milk, but this organism was not isolated from the cows which were added to the herd.

Necropsy Findings.—No generalized pathological changes were found in the animal which was slaughtered. An abscess 10 cm. in diameter was found in the lower one third of the right front quarter. A gray, viscous exudate obtained from this abscess yielded a pure culture of *C. tropicalis*. The organism was also found in the milk of three of the four quarters.

Tissues were fixed in 10 per cent formalin, sectioned, and stained with hematoxylin and eosin and Gram's stains. Microscopically, a yeastlike organism was observed in the alveoli and collecting ducts of two of the quarters (fig. 1, 2). With the exception of the abscessed area, the organisms did not appear to penetrate the interlobular or periductal tissue. Cellular infiltration of the interlobular tissue was minimal and lymphocytic in nature.

Discussion

The fact that the entire herd was affected with acute mastitis five to eight days after treatment indicates that the organism was introduced during the course of antibiotic treatment although no isolations could be made from the antibiotic preparation or the distilled water diluent. The development of the condition did not follow the milking order and became generalized more rapidly than would be expected if the spread occurred during the milking procedures. The appearance of the infection subsequent to a course of antibiotic therapy in which customary precautions were taken emphasizes the need for extreme care in the administration of antibiotics by infusion.

Some of the animals continued to harbor Candida organisms for four months or longer.

The low invasiveness of the organism is illustrated by its failure to spread to new animals which were added to the herd despite the fact that no effort was made

to milk the infected animals last and dry storage of teat cup inflations was practiced.

Candida tropicalis is not generally considered pathogenic for man and can quite frequently be isolated from normal individuals[3] who may constitute the source of infection.

SUMMARY

1) Bovine mastitis caused by *Candida tropicalis* developed in 45 quarters of the 15 cows in a herd within five to eight days after all 60 quarters were treated with an antibiotic.

2) Mastitis caused by this organism seems to be self-limiting in the majority of cases.

3) The organism persisted in the udder for at least four months.

4) The necessity for extreme care in administrating antibiotics by udder infusion is emphasized.

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Ketone Bodies in the Ruminant

The administration of acetone, acetoacetate, and isopropanol separately to cattle and sheep, by mouth or intravenous injection, was found to produce a transient form of ketonemia. There was a high degree of interchange between these ketone bodies in the blood, tissues, and rumen. The rumen appeared to be the main, if not the only, site of formation of isopropanol.

The relatively large amount of isopropanol in rumen fluid and urine of animals with clinical ketosis, as compared with the amount resulting from starvation or acetoacetate injection, indicates that other factors such as abnormal ruminal conditions may be involved in clinical ketosis.—*Christian Thin et al. in J. Comp. Path. & Therap., 69, (Jan., 1959): 45.*

Q Fever in Russia

Rickettsia burnetii were found in milk, nasal mucus, and excreta of infected cattle. It was viable in excreta for at least 90 days, and was widely distributed in dust, pasture, and water on infected farms.—*Vet. Bull. (Feb., 1959): Item 419.*

• • •

Six lambs inoculated subcutaneously with three doses of a formolized suspension of *R. burnetii*, at ten-day intervals, developed high titers of complement-fixing antibody after six to eight weeks. All 6 resisted challenge 35 days later, but 2 developed transient fever in two to three days. Antibodies were found in the serums of lambs born to infected ewes but the titers disappeared after two to four months.—*Vet. Bull. (Feb., 1959): Item 420.*

• • •

Complement-fixing antibodies to *R. burnetii* were found in the serums of 133 of 485 cows tested, 53 of 186 goats, 13 of 21 sheep, and from a pig, a donkey, and a camel. Two strains of Rickettsia were isolated from 303 milk samples.—*Vet. Bull. (Feb., 1959): Item 421.*

Antibiotics in Raw Milk—A Case History in Prevention

I. A. SCHIPPER, M.S., D.V.M., and CLARENCE C. OLSON, M.S.

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IT HAS BEEN stated that, "The unsolved question concerning the safety of antibiotics in foods seems indeed to emphasize the need for re-evaluation of the principles of disease prevention and sanitation which antibiotics seem to be displacing."[1]

The acquisition of sensitivity to antibiotics presents one of the great public health problems of today. Numerous reports of reactions, many severe enough to warrant medical attention, have been published.[3,9,10] In some instances, records indicate that the affected individuals have never received antibiotics therapeutically, and in too many instances, fatal anaphylactic reactions have resulted. It would seem, therefore, that antibiotic hypersensitivity in man may possibly result from the handling or consumption of foods containing antibiotics.

Of the various ways in which antibiotics are used in the livestock industry, their prophylactic and therapeutic use in bovine mastitis has been most abused. This is due in part to extensive advertising, misguiding information, and unrestricted sale of antibiotics.

A national survey[12] showed penicillin to be present in 5.9 to 11.6 per cent of bottled milk following complete processing for home delivery. Concentrations ranged from 0.003 to 0.550 units per milliliter or as much as 550.0 units per quart. Other antibiotics, less often used for mastitis, were present in concentrations of 0.011 to 1.0 μg. per milliliter. Antibiotic-resistant, potential pathogens for man have been found in cheese. The investigators concluded that:

> Results suggest the possibility that where penicillin or other antibiotics are used with dairy cattle, the survival of resistant organisms may lead to widespread distribution of resistant strains into the homes of the general populace, since staphylococci and streptococci, often in large numbers are of common occurrence in cheese.[11] Foods so contaminated may well contribute to the severity of the problems arising from infections in man with resistant strains without the patients having received prior antibiotic therapy or without having been exposed to endemic infections within hospitals.

Numerous workers[2,4,8] have demonstrated the presence of antibiotics in milk for 72 hours following intramammary infusion. On the basis of these findings, it is recommended that all milk obtained for 72 hours following antibiotic treatment not be utilized for human consumption. However, no means of effectively enforcing this suggestion exists at present.

Mastitis has been a big problem for dairymen for many years. The discovery of the sulfonamides and antibiotics set off a chain of deceptive proposals for its control and eradication. As a result, not only has mastitis increased, but there is now the added problem of antibiotics in dairy products.

Upon critically examining the existing mastitis problem and the associated problem of antibiotics in milk, it was readily concluded that:

1) There is a need for a simple mastitis prevention program based on practical dairy management without the prophylactic use of antibiotics.

2) If clinical mastitis could be prevented, there would be no need for the extensive use of antibiotics, and their presence in milk would be eliminated.

3) Such a program would require the cooperative efforts of dairymen, veterinarians, research workers, milk inspectors, and public health workers.

INVESTIGATIONAL PROCEDURE

Two milk routes were randomly selected for investigation; the producers were unaware that their milk or routes were being studied. Milk samples were collected by the

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Approved for publication by the director, North Dakota Agricultural Experiment station, Fargo.

The authors acknowledge the cooperation and assistance of C. L. Bradley, Adelbert Hanson, and Donald Lammers, Sanitation Division, City Health Dept., Fargo; Ernie Malmskog and Milfred Stephensen, fieldmen, Cass Clay Creameries, Fargo; Ben R. Ansley, Ansley Dairy Equipment Co., Fargo; Dr. L. G. Best, veterinarian, Wahpeton, N. Dak.; Dr. J. F. Larson, veterinarian, Breckenridge, Minn.; Dr. Henry Welch, director, Division of Antibiotics, Food and Drug Administration, Washington, D.C. The authors also thank the milk producers whose cooperation made this investigation possible.

TABLE 1—Results of Whiteside Tests for Mastitis Made on Bulk Tank Milk Samples Collected From Two Milk Routes and Representing Individual Herds

Date	Route 1*					Route 2**				
	Negative	1+	2+	3+	Positive (%)	Negative	1+	2+	3+	Positive (%)
Nov. 25-57	11	4	2	0	35.0	16	4	2	0	27.2
Dec. 23-57	14	3	0	0	17.7	19	3	0	0	13.6
Jan. 14-58	13	1	2	1	23.5	12	5	4	1	45.4
Feb. 25-58	13	3	1	0	23.5	8	3	10	1	63.6
March 13-58	Meetings held — mastitis prevention program presented									
March 26-58	16	1	0	0	5.8	20	2	0	0	9.9
April 7-58	16	1	0	0	5.8	21	1	0	0	4.5
May 6-58	16	1	0	0	5.8	20	2	0	0	9.9
June 10-58	12	4	1	0	29.4	15	6	1	0	31.8

*Samples from 17 herds; **samples from 22 herds.

truck drivers at approximately monthly intervals from November, 1957, through June, 1958. Samples were immediately cooled and forwarded to the laboratory. Whiteside tests were made to determine the incidence of mastitis.[5] Thirty milliliters of each sample was frozen and tested for antibiotic content.

Following completion of the collection and analysis of the milk samples in March, meetings with the producers of each route were conducted cooperatively by people representing veterinary research, dairy extension service, milk inspectors, city health departments, creamery fieldmen, milking equipment manufacturers, county agricultural agents, and local practicing veterinarians. The purpose and procedures of the investigation were explained to the milk producers. Emphasis was placed on a simple mastitis prevention program[6,7] which, in brief, contained the following points:

1) Mastitis is a preventable disease.

2) The faults in management which commonly cause mastitis are: failure to keep the milking machine in proper condition; failure to remove the milking machine from the cow when milk ceases to flow; and exposure of udders to cold, dampness, drafts, and trauma.

3) The strip cup, being the only reliable test available to the farmer, should be used at every milking.

4) The use of intramammary medication without proper guidance should be avoided.

5) When mastitis occurs, the infected quarter should be completely milked out at one half- to hour-intervals for at least five to six times. Then, if it appears that no progress is being made, the dairyman should engage the services of a competent veterinarian immediately.

6) Mixing milk from mastitic quarters with normal milk delivered to the creamery constitutes adulteration under federal and state laws.

7) Milk from treated quarters must be discarded for at least 72 hours following intramammary medication.

Part of each meeting was devoted to an informal discussion and question period.

Periodic visits were made to farms selected at random during April and May. Following each sample collection and its analysis, newsletters were sent to each producer to describe the progress made.

DISCUSSION AND RESULTS

The incidence of mastitis found in the herds under investigation was tabulated (table 1). A sequel to the incidence of mastitis was the presence of antibiotics in milk (table 2), indicating that the dairymen

TABLE 2—Antibiotic Content of Bulk Tank Milk Samples from Individual Herds

Date	Route 1* No. containing antibiotics	Route 2** No. containing antibiotics	Percentage of total
Nov. 25-57	0	3	8.1
Jan. 14-58	1	1	5.4
Feb. 25-58	1	4	13.5
March 13-58	Meeting held — mastitis prevention program presented		
March 26-58	0	0	0
April 7-58	0	0	0
May 6-58	0	0	0
June 10-58	0	0	0

*Samples from 17 herds; **samples from 22 herds.

were using intramammary medication as a means of control.

From the standpoint of veterinary service and professional approach to mastitis therapy, the two milk routes in this investigation were vastly different. The pro-

ducers serviced by route 1 could get competent veterinary service which included systemic medication and some professional advice pertaining to prevention. Because of the success of this approach, confident dairymen called for veterinary service early and did not use home medication.

The veterinary service available to the producers of route 2 consisted of hurried intramammary medication and the dairymen were critical of the service. Medication was provided in the tube form available to them at drug stores and other outlets at a much lower cost. In addition, veterinary service was often not available for 12 to 36 hours following attempts to attain it.

Following the cooperative presentation of the simple practical mastitis prevention program described, there occurred a sharp decline in clinical mastitis and the complete elimination of antibiotics in milk delivered to the creamery (tables 1, 2). These achievements are particularly significant because they came at the time of crop planting and the haying season when the dairyman often neglects or rushes through his herd management procedures.

Complaints were registered by one traveling salesman of intramammary mastitis remedies and two drug store owners because this program had grossly decreased their sales of intramammary tube preparations.

SUMMARY

Milk samples obtained from two delivery routes were tested for evidence of mastitis and for antibiotic content. Drastic reduction of the incidence of mastitis was achieved in this small area through a simple prevention program based upon cooperation of the dairymen, veterinarians, milk inspectors, creamery fieldmen, milking equipment manufacturers, servicemen, agricultural extension service, and those associated with research. At the same time, the problem of undesirable levels of antibiotics in market milk was eliminated.

This practical program did not include expensive testing and diagnostic procedures.

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Leptospirosis in Feedlot Cattle

Leptospirosis is becoming more prevalent in feedlot cattle, but not usually as an acute condition. The typical picture is that of a number of unthrifty individuals with some degree of anemia and icterus. A positive diagnosis depends upon blood testing.

Dihydrostreptomycin is given for three or four days. Broad-spectrum antibiotics are preferred for those acutely affected and for those failing to respond to dihydrostreptomycin. Blood transfusions are necessary in severe cases.

The disease can be prevented if all incoming animals are vaccinated.—*E. H. Scheele, D.V.M., Greeley, Colo., at the February, 1959, meeting of the Colorado V.M.A.*

Bovine Vibriosis Not Produced by Vulvar Exposure

Contrary to previous reports, drastic exposure to *Vibrio fetus* by vulvar inoculation, repeated two or three times at five- to seven-day intervals, failed to cause infection in a number of heifers.—*K. McEntee et al. in Cornell Vet. (Jan., 1959): 34.*

Chlortetracycline in the Colostrum and Milk of Ewes

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Moscow, Idaho

EACH YEAR, Idaho lamb production is threatened with the highly infectious disease known as white scours. The disease does not occur every year on the same ranch or in the same locality, but possibly 50 per cent of the lambs born annually in Idaho are infected or exposed to it. Most commonly, the disease occurs in lambs within 12 hours after birth and a high percentage of those infected die if they are not given adequate treatment. Lambs given a 20-mg. tablet of chlortetracycline immediately after birth usually do not become infected. Those given a 20-mg. tablet after they start to scour will often survive the attack, but their growth is retarded. Such lambs are not considered as suitable for retention in the breeding flock, nor is their value as great as that of uninfected ones.

Reports of feeding chlortetracycline to dairy cows[2] and to sows[1,3] showed that a certain amount of this antibiotic was excreted in the milk. Whether the same thing occurred in ewes and to what extent was not known. With this in mind, the owners of five ranches agreed to cooperate with the Department of Veterinary Science, University of Idaho, during the lambing season of 1956 to 1957 to determine the effect on lamb scours of feeding this antibiotic to pregnant ewes.

Starting five days before lambing, ewes were group-fed grain and hay pellets containing sufficient chlortetracycline to give each ewe 80 mg. of the antibiotic daily. This was continued until the ewes lambed. An approximately equal number of untreated control ewes was used at each ranch. Altogether, 5,754 ewes were treated and 5,296 served as controls. Observations on the incidence of scours in the lambs from both groups of ewes were recorded.

There was very little difference in the occurrence of the disease in lambs from treated and untreated ewes.

Since group-feeding of an average 80-mg. dose of the antibiotic daily to each ewe failed to give a concentration of the antibiotic in the colostrum and milk sufficient to prevent lamb scours, it was decided to find out if larger known amounts of the antibiotic given orally would bring about the desired levels.

TABLE 1—Chlortetracycline in the Colostrum and Milk of Ewes in Group 5—Each Ewe Was Given 500 mg. of the Antibiotic Daily Until Lambing

		Chlortetracycline (μg./ml.) in colostrum and milk				
Ewe (No.)	Days ewe was treated	1st day	2nd day	3rd day	4th day	5th day
4069	9	0.05	0.37	0.09	0.00	0.00
4261	18	0.24	0.11	0.27	0.05	0.00
4052	11	0.13	0.09	0.12	0.00	0.00
999	22	0.20	0.20	0.00	0.00	0.00
4169	16	0.35	0.12	0.00	0.00	0.00
Total		0.97	0.89	0.48	0.05	0.00
Average		0.19	0.18	0.096	0.01	0.00

TABLE 2—Chlortetracycline in the Colostrum and Milk of Ewes in Group 7—Each Ewe Was Given 300 mg. of the Antibiotic Daily Until Lambing

		Chlortetracycline (μg./ml.) in colostrum and milk				
Ewe (No.)	Days ewe was treated	1st day	2nd day	3rd day	4th day	5th day
4186	22	0.13	0.32	0.00	0.00	0.00
4185	30	0.08	0.04	0.00	0.00	0.00
2011	13	0.13	0.18	0.00	0.00	0.00
2022	18	0.09	0.05	0.00	0.00	0.00
Total		0.43	0.59	0.00	0.00	0.00
Average		0.11	0.15	0.00	0.00	0.00

Most sheep producers begin feeding grain, to which an antibiotic can be added, about five days before lambing is due to start. Since it was desired to simulate ranch conditions as nearly as possible, pregnant ewes believed to be near the lambing period were obtained from the Department of Animal Husbandry flocks for experimental trials.

PROCEDURE

Ten bred White Face ewes, brought to the veterinary research barn on Feb. 1, 1958, were al-

From the Department of Veterinary Science, Idaho Agricultural Experiment Station, Moscow.

Published with the approval of the director of the Idaho Agricultural Experiment Station as paper No. 455.

Chlortetracycline (Aurofac 10 and Aureomycin capsules), biological assays of samples, and necessary funds to carry out these trials, were supplied by the American Cyanamid Company of Princeton, N.J. The Department of Animal Husbandry of the University of Idaho supplied the ewes for the experiment.

TABLE 3—Chlortetracycline in the Colostrum and Milk of Ewes in Group 6—Each Ewe Was Given 500 mg. of the Antibiotic Daily for Nine or 15 Days and then Removed from Treatment; Treatment Was Resumed at the Time of Lambing

Ewe (No.)	Days ewe was treated	Days ewe was off treatment	Chlortetracycline (μg./ml.) in colostrum and milk				
			1st day	2nd day	3rd day	4th day	5th day
2043	15	5	0.00	0.54	1.50	0.80	0.57
4238	15	7	0.00	1.74	1.44	1.44	0.38
4190	9	9	0.00	0.93	1.81	1.94	1.26
4088	9	14	0.00	0.83	0.67	0.86	0.86
4299	15	14	0.00	0.10	0.48	1.27	1.36
Total			0.00	4.14	5.90	6.31	4.43
Average			0.00	0.83	1.18	1.26	0.89

lotted to two groups of 5 each and 500 mg. of crystalline chlortetracycline in capsules was administered orally to each ewe in group 1, daily. Each ewe in group 2 was given, orally, 300 mg. in capsules daily.

On February 5, 10 more bred ewes were added to the experiment and allotted to groups 3 and 4. Each ewe in group 3 was given 500 mg. of chlortetracycline in capsules daily and each one in group 4 was given 300 mg. in capsules daily. Two of these ewes failed to lamb during the course of the experiment.

Due to a lack of knowledge as to the approximate lambing dates of the borrowed ewes, it was necessary to revise the experiment. On February 15 no ewe had lambed, so groups 1 and 3 were combined and allotted to groups 5 and 6. Two ewes from group 1 and 3 from group 3 were placed in group 5 and each was continued on 500 mg. daily until lambing, at which time the medication was stopped. Three of group 1 and 2 of group 2 were combined into group 6. No further antibiotic was given until each ewe lambed, at which time they were again given 500 mg. daily for five days.

Three ewes from group 3 and 2 from group 4 were combined into group 7 and each was given 300 mg. of the antibiotic daily until lambing, at which time treatment was stopped. Two ewes from group 3 and 3 from group 4 were combined into group 8 and treatment discontinued. As soon as each ewe lambed, she was again started on 300 mg. of the antibiotic daily.

As soon as a ewe lambed in either group, her udder and teats were washed with soap and water and an antiseptic applied. At that time, approximately 10 ml. of colostrum was milked directly into a sterile vial, chilled in ice water, and then frozen. At approximately 24-hour intervals after this, about 10 ml. of milk was taken from the ewe for four more milkings and the samples stored in the same manner. This procedure was followed with each ewe as she lambed.

Samples were permitted to accumulate until 30 had been collected, when they were packed in dry ice in a special shipping container and sent by air express to a commercial laboratory* to be assayed for the presence of chlortetracycline. Shipments of 30 samples each were made as they became available.

Milk samples from 5 ewes not in this experiment were also submitted for assay.

TABLE 4—Chlortetracycline in the Colostrum and Milk of Ewes in Group 8—Each Ewe Was Given 300 mg. of the Antibiotic Daily for Nine or 15 Days and then Removed from Treatment; Treatment Was Resumed at the Time of Lambing

Ewe (No.)	Days ewe was treated	Days ewe was off treatment	Chlortetracycline (μg./ml.) in colostrum and milk				
			1st day	2nd day	3rd day	4th day	5th day
2451	15	3	0.00	0.15	0.39	0.00	broken
4167	9	11	0.00	0.63	0.67	0.64	0.54
4239	15	12	0.00	0.11	0.22	0.50	0.18
4233	9	18	0.00		no samples		
Total			0.00	0.89	1.28	1.14	0.72
Average			0.00	0.30	0.43	0.38	0.36

RESULTS

In groups 5 and 7, in which treatment was continuously given until lambing time and then stopped, the average amounts of antibiotic in the colostrum in the first examination were 0.19 μg./ml. and 0.16 μg./ml., respectively, with decreasing amounts on subsequent days (tables 1, 2).

In groups 6 and 8, in which continuous treatment had been stopped and then

*American Cyanamid Co., Princeton, N.J.

started again at the time of lambing, there was no antibiotic in the colostrum at lambing time but within 24 hours it appeared in the milk and, in general, increased in amount for 72 hours (tables 3, 4).

No antibiotic was found in the milk samples taken from the 5 ewes not in the experiment.

DISCUSSION AND SUMMARY

From the results of these trials, it would appear that the daily administration of up to 500 mg. of chlortetracycline to ewes does not bring about sufficient levels of the antibiotic in the udder secretions to be of therapeutic value in lamb scours. Whether these amounts would be of prophylactic value is not known.

The antibiotic disappeared from the milk soon after oral intake was stopped in parturient ewes but appeared within 24 hours after either 300 mg. or 500 mg. was given orally at lambing time. Milk levels reached, after daily oral administration, appeared to be maximal at 72 hours but receded in 96 hours even though daily oral intake was maintained. Whether they would have continued to recede to the level found in the ewes continuously fed the antibiotic until the time of parturition was not determined.

It appears that the preparturient udder is incapable of storing more than small amounts of chlortetracycline (Aureomycin) when the antibiotic is administered orally to ewes.

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[1]Elliot, Ralph, and Gouge, Hardin E., American Cyanamid Company, Pearl River, N.Y.: Personal communication, 1958.

[2]Henderson, B. W., Cobble, J. W., and Easterbrooks, H. L.: The Recovery of Milk and Blood Levels of Aureomycin when Fed to Lactating Dairy Cows. J. Dai. Sci., *40*, (1957): 617.

[3]Maddock, H. M., Catron, D. V., Speer, V. C., Cuff, P. W. W., and Ashton, G. C.: Concentration of Chlortetracycline in Sows' Milk After Oral Administration. Antibiot. & Chemo., *3*, (1953): 1075.

Staphylococcic Resistance to Antibiotics

Hospitals in Britain tried to keep erythromycin and novobiocin in reserve to be used only for staphylococcic infections resistant to other antibiotics. By 1957, half the staphylococcic infections had such resistance that erythromycin and novobiocin had to be used. However, since this organism readily develops resistance to these two antibiotics, they are always used in combination with other antibiotics.

Cross-resistance for erythromycin developed in nearly half of the patients treated with chloramphenicol only, but no cross-resistance developed between erythromycin and novobiocin. Of 108 patients treated with the latter two antibiotics, none yielded a Staphylococcus resistant to erythromycin.—*Brit. Med. J. (Dec. 6, 1958): 1377.*

A Fourth Tetracycline Antibiotic

In medicine, in this country, tetracycline has largely replaced chlortetracycline and oxytetracycline. A new tetracycline, demethylchlortetracycline, has a marked advantage over the others in being more resistant to degradation by acid and alkali.

It is more active than tetracycline against three common strains of organisms —*Bacillus cereus*, a Streptococcus, and a Staphylococcus. It is cleared by the kidneys more slowly than tetracycline, attains a higher level of antibacterial activity in the blood, and this level is better sustained both after single and repeated oral doses.

Most gram-positive and gram-negative organisms, rickettsias, and large viruses of the psittacosis-granuloma-venereum group seem to have retained their susceptibility to the tetracyclines.—*New England J. Med. (Nov. 20, 1958): 1037.*

Amphotericin B for Mycotic Peritonitis

Fungus infections have increased throughout the world following broad-spectrum antimicrobial therapy. However, the new antifungal agent, amphotericin B, has been effective clinically and experimentally against a wide variety of fungi. It is a conjugated haptene extracted from cultures of a South American strain of Streptomycetacea. It is effective orally, although the blood concentrations are low, as well as parenterally. When given intravenously (0.5 to 1.5 mg./kg. of body wt.), it results in fungistatic blood levels 20 hours after infusion. It was used successfully in a man with *Candida albicans* peritonitis, the only such case known. The man developed jaundice two months later, but it was not believed to be related to the therapy.—*New England J. Med. (March 5, 1959): 488.*

An Endotheliosis in Chickens and Turkeys Caused by an Unidentified Dietary Factor

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Gainesville, Florida

A HIGHLY FATAL disease of chickens characterized principally by hydropericardium and ascites was recognized in Georgia in March, 1957.[5] No. additional cases were reported until late summer and early fall of 1957, when extensive losses of chickens and turkeys occurred throughout the southeastern fourth of the United States.[4] This disease was popularly called "water belly," "hydropericardium," "edema disease," and "ascitic disease" by veterinarians and poultrymen.

Suspicion soon developed that losses were caused by the consumption of rations containing certain lots of animal fat. This material was excluded from commercial poultry rations and no new cases are known to have occurred subsequently. No information was found on the occurrence of this disease in other species or in man.

Clinical and pathological observations of field and experimental cases of this disease in chickens and turkeys are included in this report.

TABLE 1—Composition of Basal Diet* Fed to Control Cockerels

Ingredients	Amount (lb.)
Corn (yellow)	62.4
Soybean oil meal (50% protein)	26.5
Alfalfa meal	3.0
Fish meal (Menhaden, 60% protein)	3.0
Dried whey	2.5
Calcium carbonate	1.0
Steamed bone meal	1.5
Iodized salt	0.4
Vitamin premix**	0.6
Manganese sulfate	0.18 Gm.

*Total protein, 21.14%; calculated productive energy per pound, 949.15 calories; calorie/protein ratio, 44:90.
**Supplied per pound of feed: 2,000 I.U. vitamin A; 700 I.C.U. vitamin D_3 6μg vitamin B_{12}; 2 mg. riboflavin; 4 mg. niacin; 9 mg. calcium pantothenate; 317 mg. choline chloride; 5 mg. oxytetracycline; and 0.08 Gm. $MnSO_4$.

MATERIALS AND METHODS

Clinical and pathological examinations were made on 7- to 12-week-old chickens and turkeys from 75 poultry flocks in Florida where losses from "edema disease" occurred. Adult chickens from several flocks also were examined.

In an attempt to produce the condition, 150 healthy, 1-day-old White Leghorn cockerels were allotted at random to six groups of 25 each and housed in electrically-heated batteries with screen-wire floors. The compositions of the experimental and control rations are indicated (tables 1, 2). All birds were examined clinically and weighed each day.

TABLE 2—Composition of Experimental Rations Fed to Cockerels to Produce Edema Disease

Group	Basal diet*(lb.)	"Toxic-fat** (lb.)
1	100.0	None
2	99.5	0.5
3	99.0	1.0
4	95.0	5.0
5	90.0	10.0
6	100.0	None

*See table 1; **obtained from a commercial poultry feed manufacturer.

Hematological examinations, including hemoglobin, total erythrocytes, total and differential leukocytes, total platelets, and hematocrit measurements, were made periodically by standard methods.[2]

All birds that died were necropsied. Control chickens fed the basal diet were killed periodically, and tissues for microscopic examination were fixed in 10 per cent neutral formalin, embedded in paraffin, cut at 6μ, and stained with hematoxylin and eosin.[3] Other stains,[1,3] including Giemsa for tissues, Perls' ferrocyanide reaction for hemosiderin, Weigert's elastic stain with resorcin fuchsin, McManus periodic acid-Schiff (PAS), Masson's trichrome, and von Kossa's silver nitrate method for calcium, were used on selected tissues. Frozen sections were cut at 10μ and stained with Oil Red O. The Schultz method for cholesterol was employed on some livers.[3]

RESULTS

NATURALLY OCCURRING CASES

The onset of disease in field flocks was insidious and characterized by slight anorexia, some droopiness, dyspnea, paleness

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The authors acknowledge the technical assistance of G. L. Bailey and D. M. Stewart.

TABLE 3—Morbidity and Mortality Data* for Cockerels with Experimentally Produced Edema Disease

Group	"Toxic-fat"**(%)	No. fed	No. sick	No. died	First death (days)	Mean days to death
1	0	25	0	0	----	----
2	0.5	25	0	0	----	----
3	1.0	25	0	0	----	----
4	5.0	25	25	25	47	64
5	10.0	25	25	25	17	28
6	0	25	0	0	----	----

*All groups that remained were slaughtered on the 179th day of the experiment; **obtained from a commercial poultry feed manufacturer.

Fig. 1—Hydropericardium in an experimentally induced case of edema disease in a chicken.

of the comb and wattles, and retarded growth. These signs became progressively more pronounced in advanced cases and the birds became emaciated. In many, the abdominal cavity was visibly distended with fluid which also could be palpated. Some birds died suddenly with no premonitory signs of disease, while in others the course of illness was seven to ten days.

Hematological examinations of birds with field cases revealed marked anemia; erythrocyte counts were as low as 800,000 per cubic millimeter.

The most consistent gross lesions were hydropericardium and enlarged kidneys and livers. Fibrinous pericarditis, ascites, and subcutaneous edema occurred in some.

Marked hematological changes occurred in the chickens fed 5 and 10 per cent "toxic-fat." These changes were first detected 14 days after the start of feeding. The mean erythrocyte and thrombocyte counts were reduced 20 to 30 per cent and 40 to 60 per cent, respectively. The average total leukocyte counts for groups fed rations containing "toxic-fat" were not significantly different from those of the controls. However, there was an increased proportion of heterophils and decreased proportion of lymphocytes. In blood smears, there were many immature erythrocytes

TABLE 4—Average Blood Values* for Chickens Fed Control Rations and Ration Containing 10 Per Cent "Toxic-Fat"

"Toxic-fat" (%)	Group	Erythrocytes 10^6/cmm.	Leukocytes 10^3/cmm.	Thrombocytes 10^3/cmm.	Monocytes (%)	Lymphocytes (%)	Heterophils (%)	Eosinophils (%)	Basophils (%)
10	5	2.08	22.5	16.7	11.2	29.2	54.2	0.89	4.4
0	6	2.82	22.4	36.8	4.4	65.0	23.3	1.9	5.2

*Blood samples taken on the twenty-sixth experimental day.

EXPERIMENTALLY INDUCED CASES

The birds in all groups consumed their rations readily and made satisfactory weight gains during the first 15 days of the study. The first clinical signs of disease were noticed on the sixteenth day of feeding when a chicken in group 5 (10% "toxic-fat") died after a brief period of anorexia and droopiness. All of the chickens in this group died after 16 to 49 days of experimental feeding (av. 28 days). A chicken in group 4 (5% "toxic-fat") was found dead on day 47 and the last of this group died on day 98 (av. 64 days). Clinical signs were identical to those in naturally occurring cases. Morbidity and mortality data are summarized (table 3).

but no other morphological or hematological changes. Hematological data obtained on the twenty-sixth experimental day for chickens fed the control ration and the ration containing 10 per cent "toxic-fat" are tabulated (table 4).

Chickens that died after consuming rations containing "toxic-fat" for five to six weeks showed hydropericardium, pale and enlarged kidneys, hypertrophic spleens, and enlarged but normal-colored livers. Chickens that died after consuming the "toxic-fat" for a longer time had, in addition to the foregoing changes, ascites, pale pectoral musculature, gelatinous subcutaneous edema, and advanced hepatic changes as evidenced by enlarged bleached

livers with lobulated external surfaces. Colorless or amber-colored fluid was found in the pericardial sac (fig. 1) and usually in the peritoneal cavity (fig. 2) in amounts up to 25 and 300 ml., respectively. This fluid was sometimes coagulated.

HISTOPATHOLOGY

Liver.—Bile duct hyperplasia with severe degeneration of epithelium including desquamation, hydropic degeneration, and necrosis was observed. This caused collapse and occlusion of affected bile ducts (fig. 3). Patent bile ducts often contained inspissated bile and crystallized bile salts in the form of rosettes of fine crystals. They were blue-green in sections stained for hemosiderin and may have caused erosion of bile duct epithelium (fig. 4, 5).

Centrolobular and peripheral necrosis was common (fig. 6). In some sections of liver, the spaces of Disse between the walls of sinusoids and the hepatic epithelium were dilated and contained proteinaceous fluid. Fatty degeneration was observed in a few cases. The capsule of the liver occasionally was thickened. A few small focal accumulations of acidophils and lymphocytes were found in the portal triad region of experimental birds.

In field cases, massive accumulations of lymphocytes and acidophils were found distributed throughout the liver, but were especially prevalent in the portal triad area. They also were present in the wall of the portal vein. The accumulations of lymphocytes and acidophils in the region of the portal triad caused compression, distortion, and reduction of lumen capacity of bile ducts. The Schultz reaction for cholesteral was negative.

Kidney.—Glomerular changes were present in all cases. The glomeruli were enlarged and bloodless due to proliferation and swelling of endothelial cells of the capillaries (fig. 7). There was proliferation of the epithelial cells of Bowman's capsule with beginning crescent formation (fig. 8). The space between the visceral and parietal layers of Bowman's capsule usually was

Fig. 2—Experimentally induced case of ascites in a chicken.

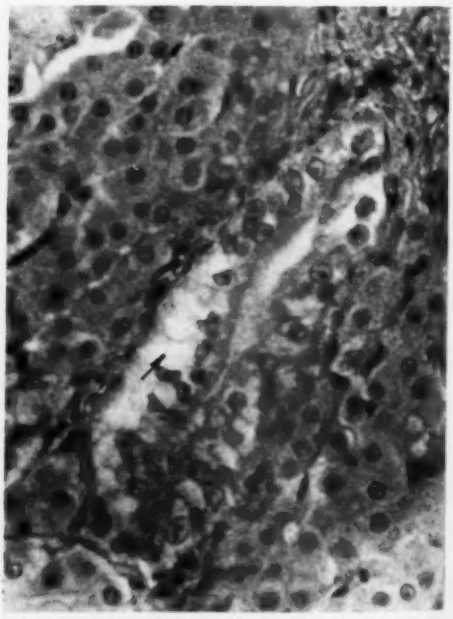

Fig. 3—Liver showing necrosis (arrow) of bile duct in a chicken with edema disease. H & E stain; x 600.

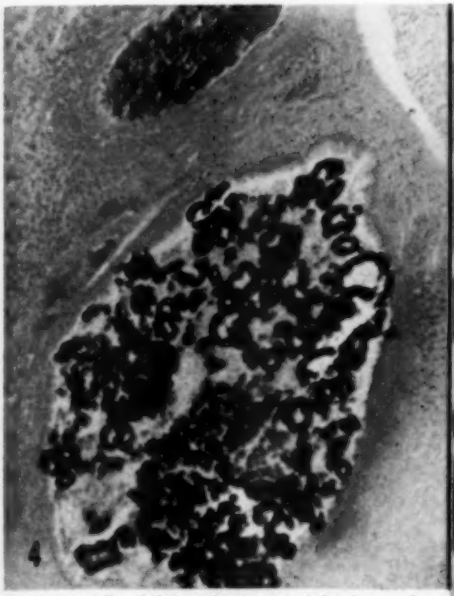

Fig. 4—Crystallized bile salts in two bile ducts of a chicken with edema disease. H & E stain; x 137.

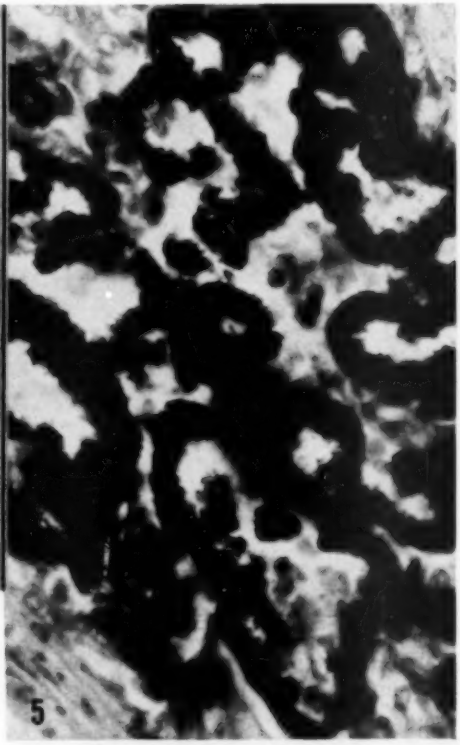

Fig. 5—Crystallized bile salts—a higher magnification of figure 4. H & E stain; x 650.

obliterated. These changes occurred throughout the kidney although some glomeruli were more severely affected than others.

In PAS stained sections, patchy hyaline thickening of the basement membrane of glomerular capillaries was evidenced by a "wire loop" appearance. This change, accompanied by proteinaceous debris in the space between the layers of Bowman's capsule, was more pronounced in those experimental cases characterized by late mortality (fig. 9). Albuminous degeneration and calcific deposits in the tubules were observed infrequently. Some tubules were dilated. Hyaline droplets or urate crystals frequently were seen in the lumina of tubules. Interstitial nephritis, as determined by lymphocytic infiltration and interstitial edema, was present in only a few cases.

The arterial and glomerular lesions persisted in recovered birds with naturally occurring cases for as long as nine months after the chickens had consumed "toxic-fat."

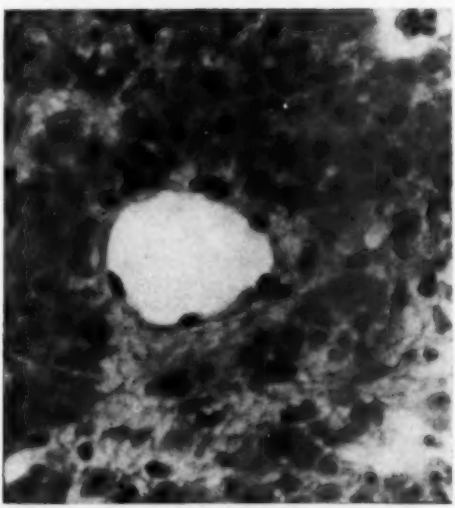

Fig. 6—Liver in a chicken with edema disease, showing necrosis around central vein. H & E stain; x 600.

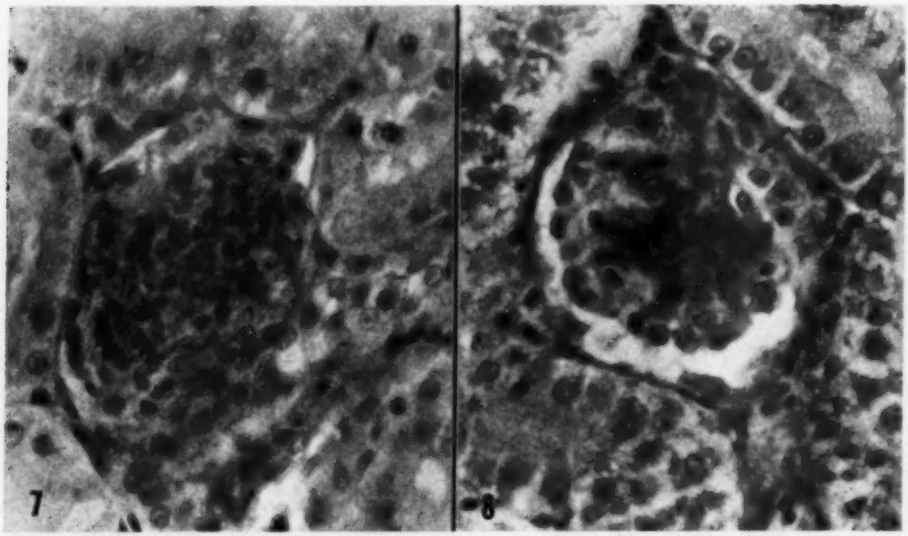

Fig. 7—The glomerulus in the kidney of a chicken with edema disease is bloodless due to swelling and proliferation of endothelial cells of glomerular capillaries. H & E stain; x 60.

Fig. 8—Glomerulus showing epithelial crescent (arrow). H & E stain; x 600.

Heart and Pericardium.—In the myocardium, there were generalized changes consisting of swollen, shredded, degenerated muscle fibers separated by edema fluid containing a few cells, principally lymphocytes and acidophils. Some hydropic degeneration of muscle fibers and focal accumulations of lymphocytes occurred. Fibrinonecrotic debris frequently covered the epicardium, especially the atrial portion. The pericardium was thickened due to the accumulation of fibrinonecrotic debris.

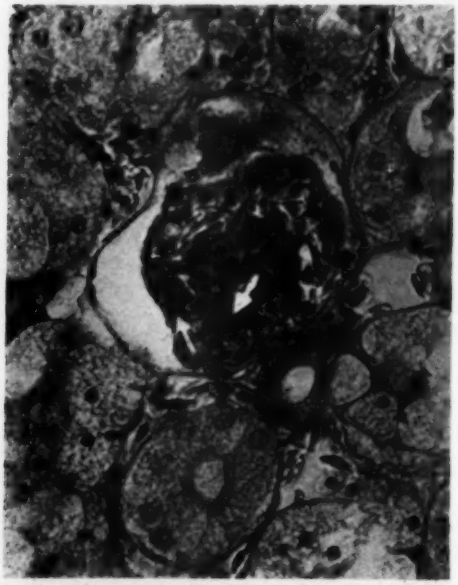

Fig. 9—Glomerulus in the kidney of a chicken, showing patchy hyaline thickening of the basement membrane (arrows) of glomerular capillaries. PAS stain; x 650.

Vascular System.—Proliferation and swelling of the endothelial cells of arterioles and small arteries resulted in diminution of the size of the lumen (fig. 10). Fragmentation or disruption of the inner elastic membrane was observed in sections stained with Weigert's elastic fiber stain. These changes occurred most frequently in vessels of the spleen, lung, kidney, and liver and less commonly in vessels of the heart, pancreas, and skeletal musculature. Proliferation and swelling of endothelial cells of the glomerular capillaries already have been described. Abnormal accumulations of lipids were not observed. No changes were observed in the large vessels.

Musculoskeletal System.—Marked degenerative changes were seen in the pectoral musculature of birds that showed ascites. Muscle fibers were swollen, fragmented, globular, necrotic, and widely separated by edematous fluid (fig. 11).

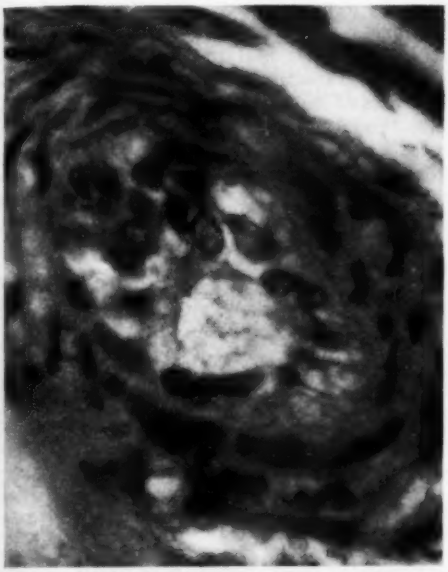

Fig. 10—Small artery in the pectoral musculature of a chicken, showing proliferation and swelling of vascular endothelium. H & E stain; x 1125.

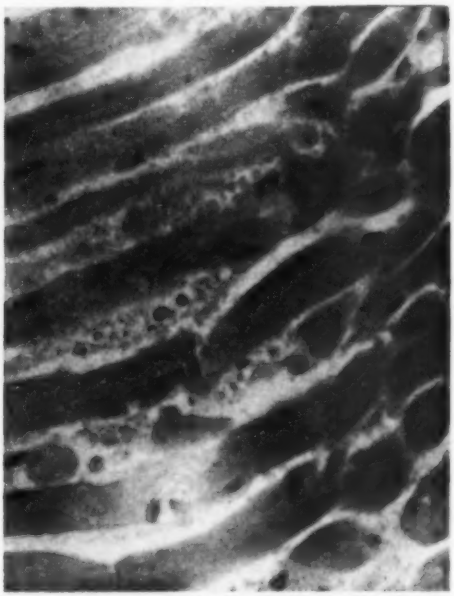

Fig. 11—Pectoral muscle of a chicken with edema disease. Notice fragmented and degenerated fibers separated by precipitated edema fluid. H & E stain; x 650.

Bone Marrow.—No significant changes were seen.

Testes.—The interstitium was infiltrated with lymphocytes.

Spleen.—There was evidence of lymphoid exhaustion and many immature erythrocytes were present in the red pulp.

Respiratory System.—No significant changes were found except evidence of bronchopneumonia in some birds with field cases.

Alimentary Canal.—No significant pathological changes were observed.

Nervous System.—Purkinje cells had pyknotic nuclei and stained deep pink with hematoxylin and eosin.

DISCUSSION AND CONCLUSIONS

Edema was the most striking gross pathological change in birds with field and experimental cases of this disease. It was manifested by hydropericardium and, in cases of long duration, by ascites also. Edema was believed to result from the vascular changes which appear to be the primary lesion of this disease. The vascular lesion, an endotheliosis, consisted of a proliferation and hypertrophy of the endothelial cells of arterioles and small arteries in most tissues. There were pronounced proliferative changes in the endothelium of the glomerular capillaries, but no significant kidney tubular changes. Necrosis of bile duct epithelium and hepatic parenchymal tissue suggested that the toxic agent may have had a necrotizing effect on those tissues. Histopathological studies did not reveal the cause of the hematological changes that were observed in field and experimental cases.

This disease does not closely resemble any other disease of poultry presently described.

These studies confirm the suspicion that this disease is caused by the consumption of certain lots of "toxic" fats. Further studies must be conducted to isolate and identify the toxic factor.

The proliferation and hypertrophy of the endothelial cells of arterioles appear to be characteristic enough to serve as the basis of a bioassay of the toxic factor in chickens. Furthermore, the effect of the toxic factor appears to be directly proportional to the dose fed, which suggests that a bioassay in chicks might be quantitative as well as qualitative.

No information was obtained on the pathogenesis of the vascular lesions.

The development of striking glomerular changes with the almost complete absence of tubular lesions suggests that the toxic factor might serve as a useful tool in studies on kidney physiology by selectively destroying glomerular function. However, there is no evidence of the occurrence of this effect in animals other than chickens.

SUMMARY

1) The clinical findings and pathological changes associated with a disease of chickens and turkeys, characterized primarily by ascites and hydropericardium, are described.

2) This disease was reproduced experimentally in chickens by feeding diets containing 5 and 10 per cent "toxic-fat."

3) Hematological examinations revealed a reduction of erythrocytes by 20 to 30 per cent and of thrombocytes by 40 to 60 per cent. There also was an increased proportion of heterophils and decreased proportion of lymphocytes.

4) The primary microscopic lesion in this disease appears to be proliferation and hypertrophy of vascular endothelium. In addition, the toxic agent may have a necrotizing effect on hepatic and bile duct tissue.

References

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Antibiotics in Feeds

Generally speaking, antibiotics in feeds have been effective, nutritious, and economical. Their use has benefited livestock production to the extent of about $1.5 billion per year.

The use of antibiotics has emphasized the importance of the health status of livestock. The benefits from antibiotics in feeds is not so much from improved nutrition as from the improved health of the animals.

Many nutritional problems are precipitated by infectious agents. Therefore, veterinarians should be cautious about ascribing the cause of malnutrition to feed just because improved rations correct the condition. He should remember that the malnutrition may have been due, in the first place, to infection.—*C. K. Whitehair, D.V.M., East Lansing, Mich.*

Effect of Fed Penicillin on Eggs

When 6,000 hens were fed a supplement of 5 mg. of procaine penicillin G per kilogram of ration, at 15 stations for nine months, it resulted in increases as follows: egg production—12.0 per cent; egg weight —1.4 per cent; *beta*-carotene and carotenoid content—about 50 per cent; hatchability—12 per cent.—*Poult. Sci., (Nov., 1958): 1299-1303.*

Environment and Zinc Deficiency

Signs of zinc deficiency were produced in White Leghorn chicks when they were raised in plastic-stainless steel cages and given glass-distilled water. A more severe zinc deficiency occurred when the brooder was coated with resin.

Zinc deficiency in chicks is shown by a reduced rate of gain, shortening and thickening of the leg bones, enlarged hocks, a reduction in bone ash, and poor feather development.—*Poult. Sci., 37, (Sept., 1958): 1094.*

Selenium and Muscular Dystrophy in Rabbits

Muscular dystrophy in young rabbits developed within three weeks when they were fed a basal vitamin E-free diet containing soybean meal as the protein source. Sodium selenite and selenocystine, when added to the basal ration, did not influence the course of the disease. It was then found that the soybean meal contained adequate levels of selenium.

Control rabbits fed the basal diet supplemented with α-tocopheryl acetate remained normal. The muscular dystrophy apparently was due to lack of α-tocopheryl alone. Selenium compounds did not suffice as substitutes for vitamin E.—*Vet. Bull. (Jan., 1959): Item 196.*

Do Dogs Have Mumps?

Few topics interest the news-reading public more than pets and children. Combine them and you have material that is certain to attract many readers. Thus, it is not surprising to see in the newspapers an occasional picture of a child and his pet,

—*World Wide Photos*

Fig. 1—". . . both with mumps."

both affected by similar conditions. When these involve fractures and prosthetic devices, veterinary readers might not be stimulated beyond sympathetic interest. But when mumps infection is reported to have occurred in child and pet simultaneously, academic interest is aroused as well. Is the disease transmissible from dog to man, or is it even a disease of dogs in the first place?

Expert Opinion

Prompted by the appearance, within a five-week period, of two syndicated news pictures (fig. 1 and 2) showing alleged mumps in dogs, several nationally-known virologists were asked to comment on the susceptibility of dogs to mumps virus infection. All agreed that although firm data on the subject are lacking, there is no substantial evidence that dogs are susceptible. One replied:

> . . . Possibly the most significant observation made [in the report of Morris, Blount, and McCowan in *Cornell Vet.*, Oct., 1956, pp. 525-531] is the fact that neither parotitis nor other clinical signs developed in dogs inoculated with mumps virus. Also, the virus could not be recovered from the saliva or the parotid gland tissues of these animals, and it was not transmitted from dog to dog by contact. The fact that antibodies were produced in inoculated dogs is not surprising, and would not necessarily mean that virus multiplication occurred. It is difficult to account for the presence of mumps antibodies in normal dogs unless (1) they resulted from exposure to the mumps virus through contact with infected man, or (2) there is an unrecognized virus, or viruses, of dogs antigenically related to the mumps virus which causes inapparent infection in dogs.

—*World Wide Photos*

Fig. 2—". . . a diagnosed case of mumps."

> The situation might be analogous to that of polio antibodies in the serum of cattle. It is doubtful that the polio virus and the mumps virus produce a clinical infection in cattle and dogs respectively, although some contend that exposure to these viruses through contact with man is sufficient to stimulate antibody production.

Another virologist pointed out that canine susceptibility to mumps was reported in 1897. (Busquet and Laveran, *Bull. Acad.*

Med. Paris, vol. 38, p. 255) but that this has remained unconfirmed. He added that:

> {The} Present state of knowledge gives no reason to believe that dogs are susceptible to infection with mumps virus. In fact, available information indicates that besides man, its natural host, mumps virus has a relatively limited experimental host range. Only the chimpanzee and certain species of lower simians have successfully been infected with recent isolates of the virus. In addition, the virus has been grown in the chicken embryo and, following laboratory adaptation, was made virulent to some suckling rodents.

STRICTLY SPEAKING

The question of mumps infection in pets is one that every practitioner can expect to meet sooner or later. He can expect it to be the subject of an occasional phone query, and somewhat less often will be asked to treat dogs affected with what could conveniently be called mumps.

However, until more knowledge of the subject comes to light, it would seem prudent to diagnose "parotitis" when canine parotid glands are swollen and inflamed. The domestic animals are already clearly involved in a number of diseases common to man and animals. The longer veterinarians continue to diagnose mumps in dogs, the harder will it be to keep the record straight.

Veterinary Medicine in Public Health Programs

The veterinarian is at the outposts of surveillance in the public health effort to break the chain of transmission of such diseases as rabies, psittacosis, the encephalitides, and leptospirosis. He is also in the front lines of control when such diseases are encountered in human populations. Although much progress has been made in the control of anthrax and brucellosis, these and other older, better-understood infections still occur in animals and man in this country. Their prevention and control requires the team approach of the veterinarian and other public health specialists.

Not only has the veterinarian found new roles in the prevention of infectious diseases and in public health research, he is also playing an increasingly important role in medical research institutions. The number and variety of experimental animals now in use, the tremendous range of procedures and agents applied in laboratory studies, and the necessity for meticulous control have greatly enhanced the importance of animal care. The quality both of the experimental colony and its care depends upon veterinary medicine of a high order.—*Leroy E. Burney, M.D., Surgeon General, U. S. Public Health Service, at the 75th anniversary of the Univ. of Pennsylvania School of Veterinary Medicine, Philadelphia, Feb. 16, 1959.*

Radiology in Veterinary Medicine

Diagnostic radiology can and should be used by every veterinarian in general practice. By utilizing at its maximum potential the usual equipment available, good radiographs can be obtained. High kilovoltage, 80-85 kv.p., produces the best diagnostic radiographs and allows the exposure time to be reduced. The use of faster x-ray film also allows reduction in exposure time. Shorter time exposure improves radiographic detail by allowing less time for the animal to move. To preclude fog from secondary radiation, a grid should be used when animals or their parts are thicker than 11 cm. Oblique positions allow better visualization of certain lesions.

Radiographic interpretation, in general, depends upon two things: location of the lesion and classification of the findings. Careful, detailed examination of the radiograph by systems (skeletal, gastrointestinal, etc.) is essential for location of abnormalities and a complete knowledge of normal anatomy is imperative. A radiograph of the same area of a normal animal may be used side by side with the one in question. Classification depends upon knowledge and experience with the disease conditions.—*William D. Carlson, D.V.M., Ph.D., Fort Collins, Colo., at the January, 1959, meeting of the Intermountain V.M.A., Salt Lake City.*

Abstracts

Characteristics of Hog Cholera Virus Grown in Tissue Culture

Additional studies of *in vitro* propagation of hog cholera virus in a Maitland system of tissue culture are reported. The eleventh and fifteenth passages of a new line each had infectivity titers of 10^{-5}. The thirtieth passage was highly virulent and produced typical hog cholera and death of affected animals, usually within 15 days.

By the tests used, hyperimmune serum prepared with virus propagated *in vitro* was somewhat less potent than commercially produced anti-hog cholera serum. Several possible causes for this are suggested, one being the low-infectivity titer of the virus.

No qualitative or quantitative differences in the virus were detected when horse serum was substituted for swine serum in the tissue culture medium. Swine spleen, after refrigeration at 4 C. for three and four days, supported virus propagation, but not after refrigeration for seven days.

Pigs treated simultaneously with virus propagated *in vitro* and anti-hog cholera serum prepared with virus propagated *in vitro* were solidly immune when challenged nine months later.

Vaccines were prepared by incubation in the *in vitro*-propagated virus at 37 C. for two weeks. Of 12 vaccines prepared from 12 different serial passages, three showed immunogenic value, but in each case only 1 pig of 2 vaccinated survived challenge.—[*C. N. Dale and J. R. Songer: In Vitro Propagation of Hog Cholera Virus. II. Some Biological and Immunological Characteristics of Hog Cholera Virus Grown in Tissue Culture. Am. J. Vet. Res. 20, (March, 1959): 304-310.*]

Interference with Newcastle Disease Infection

Exposure of chickens to infectious bronchitis virus (IBV) simultaneously, or with short intervals preceding that of Newcastle disease virus (NDV), may produce a variety of reactions. Variation in concentration of the viruses at time of exposure, and with the route of inoculation, can alter the course of the disease. Both viruses can reproduce within chickens simultaneously, causing clinical signs, antibody production, and mortality. However, when IBV is given, a dosage advantage multiplication of NDV may be impaired.

The degree of this interference in chickens may vary from partial reduction in mortality to complete inhibition of NDV signs, mortality, and antibody production. The refractory state of the chicken's tissues to NDV caused by IBV appears to persist approximately two weeks. The chickens which fail to develop NDV antibodies during the period of IBV interference appear more susceptible than normal chickens to later exposure to NDV.

Intravenous exposure of chickens with normal allantoamniotic fluid, heated at 56 C. for 15 minutes, increases the resistance of the chickens to a later exposure to Newcastle disease virus. This substance is present also in heated allantoamniotic fluid containing IBV.—[*L. E. Hanson and J. O. Alberts: Factors Affecting Interference with Newcastle Disease Infection. Am. J. Vet. Res., 20, (March, 1959): 352-356.*]

Clostridium Botulinum Type C Toxoids

Six coded *Clostridium botulinum* type C toxoids, prepared from parent toxin produced in two different mediums and containing varying amounts of antigenic material, were evaluated in mink under field conditions. A seventh preparation, placebo group, had approximately the same physical characteristics as the experimental toxoids.

All except one of the toxoid lots stimulated good immunity responses in mink exposed to more than 100 mink $l.d._{50}$ of *Cl. botulinum* type C toxin administered *per os*. Mink vaccinated with one 1.0-cc. dose in the axillary space were resistant to challenge for at least 139 days. There was little variation in susceptibility to type C intoxication among male kits, female kits, and female adults. A definite correlation between the immunity responses in mice and mink to *Cl. botulinum* type C toxoids was established.—[*G. S. Appleton and P. G. White: Field Evaluation of Clostridium Type C Toxoids in Mink. Am. J. Vet. Res., 20, (Jan., 1959): 166-169.*]

A Mink Disease with Systemic Proliferation of the Plasma Cells

A disease with systemic proliferation of plasma cells is described in 36 mink in Sweden. The disease mainly affects mutation mink and appears to have some features in common with "Aleutian disease" which has recently been described in the United States. Clinical signs (emaciation, anemia, polydipsia) are evident only in the terminal stages.

At necropsy, moderately enlarged lymph nodes were seen in half the affected animals. Splenomegaly was almost invariably present. The kidneys were often enlarged, yellowish gray, with dark flecks scattered throughout the cortex. Uremia was usually present in animals with renal changes. Bence Jones protein could be demonstrated in four of five urine samples investigated.

Microscopically, large numbers of plasma cells were seen in bone marrow, spleen, and lymph nodes. Plasma cell infiltration was also found periportally in the liver, in the kidneys, lungs, testicles, ovaries, uterus, and the choroid plexuses of the brain. In the liver, bile duct proliferation was often seen. In the kidneys, protein casts were found in the convoluted tubules. Glomerular fibrosis and wire-loop glomeruli occurred in some animals.

Small paramyloid deposits were often found in lymph nodes, kidneys, spleen, bone marrow, liver, and lungs.

The findings in mink are considered in relation to the changes in plasmacytomata in bone marrow, plasma cell leukemia, and reactive plasmacytosis in

human beings. Further investigations are necessary to clarify the question of the classification of the disease.—[*Anna-Lisa Obel: Studies on a Disease in Mink with Systemic Proliferation of the Plasma Cells. Am. J. Vet. Res., 20, (March, 1959): 384-393.*]

Effect of Vitamin B_{12} Injections in Swine

Nine sows were injected intramuscularly with 250 μg. of vitamin B_{12}. Seven of them were given a second injection two weeks later. The total and combined serum vitamin B_{12} concentrations were determined at intervals up to 336 hours after the first injections, and up to 48 hours after the second.

The total serum vitamin B_{12} concentrations rose maximally within one to three hours after the injections, and then fell precipitously until plateaus occurred. The plateaus were maintained between 24 to 336 hours after the first injections. The plateaus were significantly higher than the preinjection levels. The plateaus produced by the second injections were similar to those produced by the first.

The possible use of the ratio of preinjection to plateau serum levels as an indication of the vitamin B_{12} nutritional status of an individual is discussed.

The combined serum vitamin B_{12} concentrations followed the same trends as the total serum vitamin B_{12} concentrations.—[*G. L. Frederick: The Effect of Intramuscular Injections of Vitamin B_{12} on Blood Serum Levels in Swine. Am. J. Vet. Res., 20, (March, 1959): 333-337.*]

Efficacy of Purified and N.F. Phenothiazine

The anthelmintic efficiency of purified phenothiazine preparations having a mean particle diameter of 14.5 μ and 6.6 μ were compared with preparations of N.F. phenothiazine having mean particle diameters of 10.0 μ and 2.6 μ. Trials were conducted in sheep with naturally acquired worm infections and in laboratory mice experimentally infected with *Nematospiroides dubius*.

The purified material of 6.6 μ mean particle diameter (specific surface 6,940 cm.²/Gm.) gave comparable results to an N.F. phenothiazine preparation having a mean particle diameter of 2.6 μ specific surface 17,480 cm.²/Gm.). The purified material having a mean particle diameter of 14.4 μ (specific surface 3,312 cm.²/Gm.) was only slightly less efficient than that having a mean particle diameter of 6.6 μ and the N.F. preparation having a mean particle diameter of 2.6 μ, but was markedly more efficient than the N.F. phenothiazine having a mean particle diameter of 10.0 μ (specific surface 4,412 cm.²/Gm.).

All preparations were more efficient against species of worms occurring in the abomasums than against those in the small intestines of sheep.—[*Norman F. Baker, Paul H. Allen, William M. Longhurst, and James R. Douglas: A Comparison of the Anthelmintic Efficiency of Purified and N.F. Phenothiazine. Am. J. Vet. Res., 20, (March, 1959): 409-413.*]

Furazolidone and Rabbit Mortality

The effects of continuous feeding of 0.0055 per cent furazolidone were studied on 32 white New Zealand does and their 556 young.

The drug had no effect on the mortality caused by enteritis. Deaths due to primary pneumonia were reduced, while *Pasteurella multocida* isolations were eliminated in the test lot. In the control lot, *P. multocida* was recovered from 42 per cent of the young similarly affected. Average weights of the weaned young was 7 per cent greater in the test lot. The drug fed at this level was not toxic. —[*Karl W. Hagen, Jr.: The Effects of Low Levels of Furazolidone on Rabbit Mortality. Proc. 2nd Natl. Symp. Nitrofurans in Agric. (March, 1958): 118-121.*]

Immunogenicity of Killed Newcastle Disease Vaccines

A review of literature dealing with various adjuvants used in human and veterinary medicine and their mechanism of action was presented.

The degree of immunity induced is compared in groups of chickens vaccinated with three types of inactivated Newcastle disease vaccines prepared with the GB-Texas-1948 strain of Newcastle disease virus. The adjuvants studied included ethylene glycol, aluminum hydroxide, and phosphorylated hesperidin.

The immune status of the birds was determined after primary vaccination when the chickens were 2 weeks old and revaccination when 12 weeks old. Criteria used to evaluate the immunity of chickens at various ages, 4 to 32 weeks old, included the hemagglutination-inhibition and serum-neutralization tests, challenge studies, and postchallenge virus isolation attempts.

The results of these investigations showed that the immunogenicity of vaccines made with phosphorylated hesperidin, ethylene glycol, or aluminum hydroxide was similar.—[*Eugene Gill, J. F. Sullivan, H. D. Stone, and A. S. Hundemann: Role of Adjuvants in Immunogenicity of Killed Newcastle Disease Vaccines. Am. J. Vet. Res., 20, (March, 1959): 357-365.*]

Index to Canine Liver Dysfunction

Since blood and urine uric acid levels have been mentioned many times as indexes of hepatic function on dogs, and since the sulfobromophthalein sodium (Bromsulphalein, BSP) retention test has experienced widespread use, a comparison was made of these three tests on dogs having liver damage caused by carbon tetrachloride. This was accomplished after an extensive study had been made to determine the best procedure for each test. Significant results reported on 6 dogs indicated

that BSP test showed evidence of hepatic dysfunction much earlier than could be determined by uric acid levels. That BSP retention evaluation involved much less time and expense was also important.

Results indicated that uric acid determinations would be of little value to the veterinary practitioner. The cost of reagents, the complexity of reagent mixing, the short shelf life of some reagents, and the amount of time consumed on the test would make it of academic value only. The average practicing veterinarian could not economically maintain such a test.

Simplicity, economy, and sensitivity make BSP retention the test of choice.—[*H. C. Morgan: A Comparison of Uric Acid Determinations and Sulfobromophthalein Sodium Retention Tests as an Index to Canine Liver Dysfunction. Am. J. Vet. Res., 20, (March, 1959): 372-377.*]

Susceptibility of Leghorn Chickens to Salmonella Pullorum

Evidence was obtained to show differences in breed susceptibility to pullorum disease. The Rhode Island Red was much more susceptible to *Salmonella pullorum* CDC 3522/51 than the White Leghorn. Furthermore, a difference in the $l.d._{50}$ of two strains of *S. pullorum* for each of two strains of White Leghorn chickens was observed, the Babcock being more susceptible than the West Line strain.—[*Charles D. Jeffries, D. Frank Holtman, and J. A. Cameron: Susceptibility of Certain Strains of White Leghorn Chickens to Salmonella Pullorum. Am. J. Vet. Res., 20, (March, 1959): 350-351.*]

Changes in Bovine Serum Proteins After Splenectomy

Decreases in the absolute weights of total serum proteins, *gamma* globulin, and total globulins were noticed following splenectomy in dairy calves. The decreases in these values persisted for one month after surgery when the values returned to normal.

Alpha globulin showed a slight rise during the second week following surgery, whereas *beta* globulin concentration did not fluctuate significantly during the study. The albumin: globulin ratio decreased after splenectomy and returned to presurgical value after two months. At this time, the ratio increased but returned to normal in an additional month.—[*George T. Dimopoullos, Lon E. Foote, and Gene T. Schrader: Electrophoretic Studies of Bovine Serum. I. Changes in the Serum Proteins After Splenectomy. Am. J. Vet. Res., 20, (March, 1959): 270-272.*]

Eimeria and Cooperia Infections in Calves

Twenty-five grade dairy calves were used in two experiments comparing calves receiving Eimeria spp., *Cooperia punctata,* Eimeria and Cooperia combined, and unparasitized controls.

In both experiments, the calves with the mixed infections showed greater clinical signs of parasitism, especially diarrhea and poor or no weight gains, than the calves with single infections. Of the calves with single infections, those with Eimeria spp. exhibited more pathosis than those with Cooperia alone.

There were no marked differences in numbers of worms recovered at necropsy. However, in the Cooperia-infected calves, nearly one third of the nematodes were immature, whereas in the Eimeria-Cooperia-infected calves, the immature worms ranged between 0 and 14 per cent. This indicated an interference by the Eimeria with the hosts' usual immune response to worm infections.—[*Leonard Reid Davis, Harry Herlich, and George W. Bowman: Studies on Experimental Concurrent Infections of Dairy Calves with Coccidia and Nematodes. I. Eimeria spp. and the Small Intestinal Worm, Cooperia Punctata. Am. J. Vet. Res., 20, (March, 1959): 281-286.*]

Carbamates and Related Compounds for Horse Strongyle Larvae

Screening tests for nematocidal activity against horse strongyle larvae *in vitro* were carried out on 42 carbamic acid derivatives and related compounds. Of these, 38 per cent showed some activity at a concentration of 0.01 M or lower. Nine of 25 carbamates, three of four carbamyl derivatives, none of four carbamides, and four of nine dithiocarbamates were active.

N-alkyl carbamates appeared to be more active than phenylcarbamates. Among the latter, four of six compounds known to produce local anesthesia in the guinea pig were also nematocidal.—[*Sidney Kantor, Norman D. Levine, and Gale D. Taylor: Screening Tests of Carbamates and Related Compounds Against Horse Strongyle Larvae in Vitro. Am. J. Vet. Res., 20, (March, 1959): 300-303.*]

Books and Reports

Staphylococcal Infections

In the preface it is stated that "this volume is an attempt to bring together the considerable knowledge available on the subject." The author has succeeded in preparing a manual which presents in a concise manner those aspects of staphylococcal infections which are of practical importance. It was written for the physician in practice and, therefore, no attempt was made to review the extensive literature. However, each section is followed by a short list of pertinent and recent articles.

Brief mention is made of the various tests used for identifying staphylococci. Typing by bacteriophage is illustrated and is said to be the most satisfactory but also the most laborious procedure. A system for controlling spread of staphylococcal infections in hospitals is described. It is said that probably the most important single factor in preventing outbreaks of this infection in hospitals is

hand-washing. About 80 pages are given to brief descriptions of staphylococcal infections; these include diseases of the skin, respiratory infections, osteomyelitis, gastrointestinal involvement, septicemia, and various minor staphylococcal infections.

About 18 pages are devoted to staphylococcal infections in animals. It is pointed out that staphylococci of animal origin are generally different in certain respects from those encountered in man and belong to a phage type not commonly found in man.

It is rightfully stated that more study is needed on staphylococcal infections in animals. The most important staphylococcal infection which confronts veterinarians is bovine mastitis which is briefly discussed.

Although the methods of treatment are described, with special emphasis on the use of penicillin, it is pointed out that the prognosis is not good in staphylococcal mastitis.

The final 32 pages are concerned with treatment. The use of various antibiotics is described but with a warning that these agents should be used only when clearly indicated. It is pointed out that drug-resistant staphylococci are encountered much less frequently in veterinary practice than in medical practice. This monograph is primarily for the physician but it has much of interest to the veterinarian.—[*Staphylococcal Infections. By Ian Maclean Smith. 180 pages; illustrated. Yearbook Publishers, Inc., 200 E. Illinois St., Chicago, Ill. 1958. Price $4.25.*]—ALFRED G. KARLSON.

Diseases of Wild Ruminants of Switzerland

This text is a study of diseases of small wild ruminants found in Switzerland, especially the ibex, chamois, and different kinds of deer. In 1954, studies of 1,135 animals were reported.

In the beginning, the authors describe pathological conditions resulting from the "chase" by dogs. While this may not be quite so common a practice in America, it does occur, and it is well to know what pathological changes are to be expected in such cases. In death, due to drowning, the lesions are those of acute asphyxia and the trachea and lungs are filled with fluid. Injuries are among the common causes of death. Fractures of the horns, mandibles, and legs are common.

The chapter on malformations and the possibility of hereditary congenital hydrocephalus polydactylia, and agnathia, is of genetic interest.

Springtime diarrhea in young animals is often responsible for reducing the game population. Poisonous agents, such as insecticides, and drugs (phosphorus and anticoagulants) intended for the eradication of rodents are dangerous to game. Copper sulfate and fluorides from industrial plants take their toll.

A condition called "perruque" (perüke) is of especial interest in the fields of research because it appears to be related to horn growth, tumors, and the repair of fractures. It is believed to be associated with male hormones. Tumors were found in about 1.5 per cent of the 1,017 animals examined. The most frequent sites were the liver and the head of the roebuck. Eight pages are devoted to the study of tumors. The one on epithelioma is particularly well illustrated. Fourteen pages are devoted to ecoparasites; 28 pages to helminths; and ten to protozoa.

Of the virus diseases, the authors discuss and illustrate aphthous fever, rabies, pseudorabies, contagious exanthema, and papillomatosis. Bacterial diseases described are tuberculosis, paratuberculosis, brucellosis, tetanus, rouget (erysipelas), and listeriosis. Cutaneous mycosis, actinomycosis, cystic kidneys, and epulis are also discussed.—[*Les Maladies des Ruminants Sauvages de la Suisse. By G. Bouvier, H. Burgisser, and P. A. Schneider. 132 pages; illustrated. French text with introduction in German. Orili Fussli Arts Graphiques, Dietzingerstrassa 3, S. A. Zurich 3, Switzerland, 1958. Price not given.*]—H. E. KINGMAN, Sr.

Disorders of the Equine Foot

This book, written in Spanish, is a study of the disorders of the equine foot. There are 351 pages and 267 illustrations. It is well indexed.—[*Tratado de las Enfermedades del Pie Del Caballo. By Antonio Pires. Editorial Guillermo Kraft Ltda., calle Reconquista 319-327, Buenos Aires, Argentina. 1958. Price not given.*]

Diagnosis of Animal Helminthiases

The adult and oval forms of helminths, as found in feces of domestic animals, are thoroughly described in this textbook. Detailed instructions are also given on coprology and direct and indirect methods of diagnosis of parasitic diseases.—[*Diagnostic Expérimental des Helminthoses Animales, Travaux pratiques d'Helminthologie Vétérinaire (in French). By Euzeby Jacques. 367 pages; 297 illustrations. Vigot Frères, 23, Rue de l'Ecole de Médecine, Paris 6, France. 1958. Price not given.*]—JOSEPH P. SCOTT.

Wildlife Disease

"Wildlife Disease" is the name of a quarterly publication that made its first appearance in January, 1959. It is unique in being the first serial research publication to be issued in microfilm only. Manuscripts will be printed on durable 3- by 5-inch positive photographic, microopaque reproductions.

This quarterly is the official publication of the Wildlife Disease Association which is concerned with the parasites, diseases, physiology, and other factors related to health and survival of wild animals, and the relations of such factors to domestic animals and man.

Since special optical equipment will be needed to read the cards, hand readers will be supplied to original members.—*Wildlife Disease Association, Patuxent Research Refuge, Laurel, Md.*

THE NEWS

Dr. Ferguson Dean of College of Science and Arts at M.S.U.

Dr. L. C. Ferguson (OSU '34) became dean of the College of Science and Arts at Michigan State University, effective April 1, 1959. Since July, 1956, he has been head of the Department of Microbiology and Public Health and director of the Division of Biological Science, having joined the M.S.U. staff after serving three years as professor of veterinary science at the Ohio Agricultural Experiment Station.

Dr. Ferguson is a native of Indiana, and received the D.V.M. degree at Ohio State University in 1934. He received the M.S. and Ph.D. degrees at the University of Wisconsin in 1936 and 1940, respectively.

Recognized widely as an outstanding immunologist, he received a centennial award from Michigan State University in 1955, and is an elected Fellow of the American Association for the Advancement of Science. Dr. Ferguson is a leading authority on hematology and also on leptospirosis in animals.

Dr. L. C. Ferguson

He was a member of the Departments of Veterinary Science and Genetics at the University of Wisconsin from 1934 to 1941, then served five years in the U.S. Army Veterinary Corps, rising to the rank of major. Between 1946 and 1953, he was an assistant and associate professor in Ohio State's bacteriology department.

A member of the AVMA Council on Research since 1948, Dr. Ferguson served as its chairman during 1953 and 1954. He is a member of the Society of American Bacteriologists, the Michigan V.M.A., American Association of Immunologists, New York Academy of Science, Sigma Xi, and Phi Zeta.

He is the author of many scientific papers and a chapter in the book "Advances in Veterinary Science," volume II, published in 1955. Dr. Ferguson now has the distinction of being one of the few veterinarians to assume leadership of a school or college not of veterinary medicine.

Kimble Methodology Research Award

Nominations for the eighth Kimble Methodology Research Award are being accepted until June 1, 1959. The award, which gives recognition to the application of scientific knowledge to the public health laboratory, was established by the Kimble Glass Company of Toledo, Ohio, and is sponsored by the State and Provincial Public Health Laboratory Directors.

Detailed information may be obtained from: Nominating Committee, Kimble Award Laboratory of Hygiene, Department of National Health and Welfare, Ottawa, Ont.

Veterinary Schools Eligible for Atomic Energy Commission Awards

Schools of veterinary medicine are among the latest recipients of awards, by the Atomic Energy Commission, to support purchase of equipment for training in nuclear technology as applied to life sciences. It is expected that another group of awards will be announced in June.

Interested Persons may obtain information by writing to the Director, Division of Biology and Medicine, Atomic Energy Commission, Washington 25, D.C.

AMONG THE STATES AND PROVINCES

Alabama

State Convention.—The fifty-second annual convention of the Alabama Veterinary Medical Association was held at the Houston Hotel in Dothan on March 15-17, 1959.

The program for the first day was divided into panels on large and small animal practice, with the following speakers addressing the large animal panel: Drs. W. J. Gibbons, A.P.I. staff—moderator; F. G. Schell, A.P.I. staff—equine practice; J. B. Taylor, associate state veterinarian, Elba—swine brucellosis and leptospirosis; G. C. Hardwick, Huntsville—weather and disease; C. L. Williams, Rome, Ga.—mastitis and antibiotic sensitivity; C. R. Irby, Aliceville—livestock handling; A. C. Newman, Jr., Opelika—ambulatory car. The small animal panelists were: Drs. B. F. Hoerlein, A.P.I. staff moderator; D. J. Young, Jr., Decatur—urinalysis; J. W. Hazelrig, Birmingham—skin conditions; C. L. Williams, Rome, Ga.—treatment of heartworms; L. W. Cottle, Mobile—patient and the veterinarian; G. C. Kendall, Montgomery—leptospirosis; and L. E. Irby, Spring Hill—clinical aids.

Other program speakers were: Drs. Jean Holzworth, Boston—blood disorders in cats, and prominent feline diseases; J. E. Greene, A.P.I. staff—report from Auburn; D. A. Price, associate editor, AVMA publications—the story of AVMA publications, and some diseases of sheep; J. C. Davis, Kansas City, Mo.—economic trends in veterinary practice, and stress in diagnosis and treatment; A. H. Groth, A.P.I. staff—practitioner diagnostic service; D. F. Walker, A.P.I. staff—cattle practice; B. N. Lauderdale, J. G. Milligan, R. C. Bamberg of Montgomery—brucellosis and tuberculosis programs; J. O. Knowles, Miami, Fla.—canine nephritis; T. S. Hosty, Montgomery, rabies exposure in man; and C. H. Clark, A.P.I. staff—nephritic symptoms.

Officers for 1959-1960 are: Drs. W.R. Cryar, Birmingham, president; Ray Dunlap, Guntersville, president-elect; W.P. Monroe, Anniston, vice-president; M.K. Heath, Auburn, secretary-treasurer.

The executive board of the Association made arrangements to distribute 1,800 *AVMA Veterinary Medical Career* pamphlets.

s/M. K. HEATH, *Secretary.*

Arizona

Colonel Lancaster Retires.—Colonel Harry R. Lancaster (COL '35), V.C., chief of the Meat and Dairy Hygiene Branch, Veterinary Division, Office of the Army Surgeon General, retired Dec. 3, 1958, after 22 years of service with the Army. He became assistant state veterinarian for Arizona in January, 1959.

California

Dr. Roberts Appointed to Examining Board.—Dr. Seymour R. Roberts (MSU '40), Richmond, has been appointed for a four-year term to the California Board of Examiners in Veterinary Medicine. Dr. Roberts is also secretary of the Bay Counties Veterinary Medical Association.

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Officers of Alameda Contra Costa Association.—The following officers will serve the Alameda Contra Costa Association for 1959: Drs. George H. Muller, Pittsburg, president; Thomas B. Condon, Berkeley, vice-president; John S. Blackard, Richmond, secretary; and Lawrence M. Proctor, Concord, treasurer.

s/GEORGE H. MULLER.

Colorado

Officers of State Association.—The officers of the Colorado Veterinary Medical Association for 1959 are: Drs. Ora R. Adams, Fort Collins, president-elect; B. N. Frank, Sterling, president; and Gail H. Gilbert, Arvada, secretary-treasurer.

s/G. H. GILBERT, *Secretary.*

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Women's Auxiliary

Officers of the Women's Auxiliary to the Colorado Veterinary Medical Association
Left to right (seated)—Mrs. R. C. Bishop, Greeley, secretary-treasurer; Mrs. Gary Bouton, Littleton, membership chairman; Mrs. H. J. Hill, Morrison, delegate. Standing—Mrs. Harry Jonhson, Littleton, vice-president and public relations chairman; and Mrs. E. O. Dickinson, Morrison, president.

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Conference for Veterinarians.—The twentieth annual conference for veterinarians, sponsored by the College of Veterinary Medicine, Colorado State University, was held Feb. 16-18, 1959.

The program listed the following guest speakers: Drs. Jack A. Knowles, Miami, Fla.—immunology and allergy; Arthur Herzberger, Colorado Springs—zoo practice; Jack A.

Knowles of Miami, Fla., Wm. D. Carlson of C.S.U. staff, Lee Phillips of Denver, and Homer Brown of Colorado Springs—small animal fractures; L. M. Koger, Ontario, Ore.—removal of neoplasms of bovine eye; O. W. Schalm, Davis, Calif.—milking machines and mastitis, and hematology in small animal practice; Fred W. Petersen, Avoca, Iowa—diagnosis of swine diseases; D. K. Detweiler, Philadelphia, Pa.—heart disease in dogs; C. L. Nelson, Jewel, Iowa—poultry practice; Verle Stauffer, Arvada—general practice discussion; E. H. Scheel, Greeley—feedlot practice; H. J. Hill of Denver, Cameron Seger and L. C. Faulkner of C.S.U. staff, and Eli Von Tour of Alliance, Neb.—panel on bovine infertility.

The following speakers from the staff at the veterinary college at Colorado State University, also contributed an important portion of the program: Drs. W. A. Aanes; O. R. Adams; Maxine Benjamin; Nicholas H. Booth; L. A. Griner; Glenwood P. Epling; James Ingram; Rue Jensen; William E. Morgan; Lloyd Moss; Robert E. Pierson; Glenn Severin; Kenneth Smith; James Voss; L. Keith Wayt; and Donald H. Will.

Connecticut

State Association.—The annual meeting of the Connecticut Veterinary Medical Association was held in the Hotel Bond in Hartford on Feb. 4, 1959. The principal speaker was Dr. F. R. Koutz, chairman of the Department of Parasitology, College of Veterinary Medicine, Ohio State University, Columbus, who discussed "Types of Mange in Large and Small Animals and Their Treatment."

The new officers of the Association are: Drs. Ralph V. Westerberg, Farmington, president; Harmon C. Leonard, Cheshire, first vice-president; Raymond B. Church, Winsted, second vice-president; and E. H. Patchen, Milford, executive secretary and treasurer.

s/E. H. PATCHEN, *Executive Secretary.*

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Officers of Fairfield County Association.—The following officers will serve the Fairfield County Veterinary Medical Association for 1959: Drs. Saul S. Spitzberg, Darien, president; Peter B. Olsen, Wilton, president-elect; George G. Pickett, Shelton, secretary; and Donald H. Krushak, Bridgeport, treasurer.

s/GEORGE G. PICKETT, *Secretary.*

Delaware

State Association.—The annual meeting of the Delaware Veterinary Medical Association was held at Kent Manor Inn, Wilmington, on Dec. 3, 1958.

The program included the following speakers: Mr. Henry Ridgley, attorney—discussion of the Delaware veterinary practice act; Dr. Francis Fox, New York State Veterinary College—abnormalities of the abomasum; and Dr. Salo Jonas, New Haven, Conn.—fracture repair.

The following officers were elected for the ensuing year: Drs. William Teeter, Dover, president; J. E. Robinson, Clayton, president-elect; and M. S. Cover, Newark, secretary-treasurer.

s/M. S. COVER, *Secretary.*

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Women's Auxiliary.—At the annual meeting of the Women's Auxiliary of the Delaware Veterinary Medical Association in Wilmington on Dec. 11, 1958, the following officers, all of Wilmington, were installed: Mrs. E. Jefferies Hathaway, president; Mrs. George Rosenberger, secretary-treasurer; Mrs. Paul Coogan, membership chairman; and Mrs. John L. Wilkins, publicity.

s/MRS. JOHN L. WILKINS, *Publicity Chairman.*

District of Columbia

Seminar on Feline Diseases.—The District of Columbia Academy of Veterinary Medicine offered a four-day seminar, Dec. 1-4, 1958, on feline diseases. Dr. Jean Holzworth, a member of the clinical staff of Angell Memorial Animal Hospital, Boston, presented the program at the National Institutes of Health, Bethesda, Md.

At this meeting, the new officers for 1959 were installed. They are: Drs. Harvey Cowan, president; Edgar E. Ruebush, president-elect; George H. Brumble, vice-president; Jean S. Goudy, recording secretary; and Albert C. Benson, treasurer.

A second seminar, on ophthalmology, was held Feb. 9-12, 1959, with Dr. W. C. Magrane, Mishawaka, Ind., in charge.

s/BERNARD J. BERLINER, *Publicity Chairman.*

Georgia

Women's Auxiliary.—The Officers of the Women's Auxiliary to the Georgia V.M.A. met on Dec. 5, 1958, in Atlanta to review their goals for the year—contributions to the AVMA Research Fund, to the Tifton (Georgia) Laboratory, the AVMA Auxiliary Research Fund, and the Student Loan Fund.

The officers of the auxiliary are: Mrs. H. G. Blalock, Jr., Augusta, president; Mrs. J. T. Hart, La Grange, president-elect and membership chairman; Mrs. F. E. Wilhite, Decatur, secretary; Mrs. M. E. Nunnery, Augusta, treasurer; and Mrs. C. J. Mikel, Atlanta, public relations.

s/MRS. F. E. WILHITE, *Secretary.*

Indiana

Dr. Borst Elected Secretary of Inter-professional Council.—Dr. L. M. Borst (OSU '50), Indianapolis, was elected secretary of the Indiana Inter-Professional Health Council at the December, 1958, meeting of the Council. Dr. J. E. Jordan (OSU '41) was appointed to the executive board, representing the veterinary profession.

Dr. Borst was the first veterinarian so honored in the 30-year history of the Inter-Professional Health Council.

Iowa

Dr. H. C. Smith Honored.—Dr. Hubert C. Smith (ISC '23) was honored at a banquet attended by personnel of the Sioux City Stock Yards Company, on January 26, before his departure for Sioux Falls, S. Dak.

Dr. Smith joined the staff of the Sioux City Division of Allied Laboratories in 1946 as field and laboratory diagnostician for the company. He has been prominent in interprofessional

Dr. H. C. Smith

activities, having served as president of the Sioux City Interprofessional group. He was president of the Iowa V. M. A. in 1956. The Siouxland Veterinary Association presented "Smitty" with a plaque in recognition of his outstanding aid to practitioners in the area.

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The Freshmen at I.S.C.—Of the 68 freshmen at the College of Veterinary Medicine, Iowa State College, Ames, 45 are Iowa residents, 23 nonresidents; 29 are married, 39 single; 36 have served in the Armed Forces; the average age is 23; 33 have had two years of college preparation, while the rest have had three or more years; two students have B.A. degrees, 11 have B.S. degrees, one has an M.S., and another has a Ph.D.; only one student is the son of a veterinarian.

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Officers of Central Iowa Association.—At the February, 1959, meeting of the Central Iowa Veterinary Medical Association, Dr. Grant Blake, Des Moines, was elected president; Dr. D. E. Briley, Des Moines, vice-president; Dr. Durwood Baker, Ames, second vice-president and program chairman; and Dr. S. L. Hendricks, Des Moines, secretary-treasurer.

s/S. L. HENDRICKS, *Secretary.*

Kentucky

Dr. Kreidler Honored at Banquet.—Dr. C. G. Kreidler (CIN '13), Maysville, Ky., was honored at a dinner given jointly by the Mason County (Ky.) Farm Bureau, Mason County Purebred Livestock Association, and Mason County Artificial Breeding Association.

A bronze plaque, inscribed "in appreciation of his 46 years of faithful and efficient service and constant vigilance in the practice of veterinary medicine," was presented to Dr. Kreidler and he was made a life member of the Kentucky Veterinary Medical Association, which he has served as president and as secretary. Letters lauding Dr. Kreidler's contribution to his community came from Dr. Tom Maddox of Owensboro, president of the state association, and from Governor A. B. Chandler of Kentucky.

s/SHERMAN A. GLASS.

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Women's Auxiliary.—The Women's Auxiliary to the Kentucky Veterinary Medical Association held its semiannual luncheon and business meeting Dec. 8, 1958, at the Irvin Cobb Hotel, Paducah, with 41 members in attendance.

During the business session, it was voted to increase the loan fund contribution from $25 to $50, and to send notices of state and national dues as one notice.

Social activities included a cocktail hour and dinner dance.

s/MRS. ROBERT H. FOLSOM, *Acting Secretary.*

Louisiana

Conference for Veterinarians.—The twenty-eighth annual conference for veterinarians sponsored by the Department of Veterinary Science, Louisiana State University, was held at the University on Jan. 27-28, 1959.

Those participating in the program were Drs. Frank A. O'Donnell, Kansas City, Mo.—attaining correct diagnosis, and swine vaccina-

tion programs; R. B. Lank, L.S.U.—bovine electocardiograms; Dan Anderson, Fort Worth, Texas, chairman, AVMA Executive Board—AVMA affairs as related to the man back home, and equine practice; Billie U. Flynn, Canton, Miss.—bovine eye conditions, and practice tips; W. G. Magrane, Mishawaka, Ind.—corticosteroids in ophthalmology, and canine glaucoma; Willard Pounds, New Orleans—ear trim; and John Hejl, Washington, D.C.—biological products and licensing control.

Massachusetts

Annual Meeting.—The annual meeting of the Massachusetts Veterinary Association was held Jan. 21, 1959, in Dedham. The program consisted of the following discussions: pyorrhea in man and experimental animals by Irving Glickman; modern concepts of epilepsy by H. Richard Tyler; and doctors afield by Joseph Garland, editor, *New England Journal of Medicine.*

s/MORTON WOLF, *Secretary.*

New Hampshire

Officers of State Association.—The following officers were installed at the annual meeting of the New Hampshire V.M.A., Jan. 28, 1959: Drs. Frederick Stevens, Concord, president; Clarence F. Bent, Hudson, vice-president; and Fred E. Allen, Durham, secretary-treasurer.

s/FRED E. ALLEN, *Secretary.*

New York

Laboratory Course in Electron Microscopy.—Cornell University announces the annual summer laboratory course in techniques and applications of the electron microscope. It will be held this year from June 15 to July 3.

The course is planned to meet the needs of senior research workers in the field of electron microscopy. The registration is limited to a small group, to provide ample facilities for the members to pursue extensive laboratory work in their special fields, at introductory or advanced levels depending on their previous experience. The course will include special lectures by authorities in the various fields of application. It is designed to give members an intensive survey of basic theory, as well as interpretation of results and application to research problems.

Requests for information and applications should be addressed to Professor Benjamin M. Siegel, Rockefeller Hall, Cornell University, Ithaca, N.Y.

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Interprofessional Society Formed.—On Dec. 16, 1958, the Interprofessional Society of New York State was formed in New York City.

The Association's purposes, as defined in the Constitution "shall be to link in one organization, the Medical Society of the State of New York, the Dental Society of the State of New York, the New York State Veterinary Medical Society, and other professions of the healing arts, to promote the betterment of public health and welfare, and to enlighten and direct public opinion in regard to the problems of these professions."

The affairs of the associations will be under the direction of a council composed of three representatives from the veterinary medical, dental, and medical societies.

Representatives of the New York State Veterinary Medical Society are: Dr. C. E. DeCamp, Scarsdale, and Dr. R. George Wiswall, Glens Falls, and Dr. Donald Sweet, New York City.

The officers for 1959 are: president—Dr. Donald Sweet, New York Veterinary Medical Society; secretary—Dr. W. Anderton, Medical Society of the State of New York; treasurer—Dr. Charles R. Wilkie, Dental Society of the State of New York.

For a short discussion on the value of interprofessional councils, see the item by Dr. O. Norling-Christensen in the April 1, 1957, JOURNAL (adv. p. 18).

North Carolina

Officers of Twin Carolinas Association.—The officers of the Twin Carolinas V.M.A. are: Drs. C. C. McLean, Southern Pines, N. Car., president; G. L. Lawhon, Jr., Hartville, S. Car., vice-president; and J. E. Currie, Southern Pines, N. Car., secretary.

Utah

Intermountain V.M.A. Convenes in Salt Lake City.—At the thirty-first annual meeting of the Intermountain V.M.A., held Jan. 22-24, 1959, in Salt Lake City, the following officers were elected:—Dr. L. V. Ruebel, Jerome, Idaho, president; Dr. H. E. Schaulis, Denver, Colo., president-elect; Dr. L. M. Koger, Ontario, Ore., first vice-president; and Dr. Burt Reinow, Pinedale, Wyo., second vice-president. Dr. Royal A. Bagley, Salt Lake City, retained his position as secretary-treasurer.

STATE BOARD EXAMINATIONS

IOWA—June 1-2, 1959, Office of the Division of Animals Industry, State House, Des Moines, Iowa, not later than 8 o'clock on the morning of June 1. Further information may be obtained from Dr. A. L. Sundberg, chief, Division of Animal Industry, State House, Des Moines 19, Iowa.

KENTUCKY—June 17, 1959, State Capitol Building, Frankfort, Ky. Jack E. Winkler, secretary-treasurer, Kentucky Board of Veterinary Examiners, 319 Ann St., Frankfort, Ky.

MICHIGAN—June 12-13, 1959, Lansing, Mich. These will be written, practical, and oral examinations. Applications must be on file at least 15 days before the exam, accompanied by the $25 fee. Address: State Veterinarian, 641 Lewis Cass Building, Lansing 13, Mich., John F. Quinn, corresponding secretary.

NORTH CAROLINA—June 22-24, 1959, Morehead Biltmore Hotel, Morehead City, N. Car. Dr. James I. Cornwell, secretary-treasurer, North Carolina State Veterinary Examining Board, 65 Beverly Rd., Beverly Hills, Asheville, N. Car.

OHIO—June 8-10, 1959, Sisson Hall, College of Veterinary Medicine, Ohio State University, Columbus, Ohio. Applicants must be present at 8 a. m. on the first day. Application forms may be obtained from the office of the Executive Secretary, Ohio Veterinary Medical Board, Room 720, Ohio Departments Building, Columbus 15. All application forms must be returned to the Secretary not later than May 4, 1959. Dr. H. G. Geyer, executive secretary.

TEXAS—Next licensing examination will be held June 1-3, 1959, A. & M. College of Texas, College Station. The completed application must be received in the Board office not later than 30 days before the examination date. Applications should be sent to Mr. T. D. Weaver, 207 Capital National Bank Building, Austin 16, executive secretary, State Board of Veterinary Medical Examiners.

UTAH—June 11-12, 1959, Utah State Capitol Building, Salt Lake City, Utah. Dr. Wayne Binns, chairman, Utah Veterinary Examining Board, 555 North Third East, Logan, Utah.

WISCONSIN—June 29-30, 1959, Madison, Wis. A. A. Erdmann, 6 West St., State Capitol, Madison 2, Wis.

WYOMING—June 18, 19, 1959, State Capitol, Cheyenne. For further details write Dr. G. H. Good, 304 Capitol Bldg., Cheyenne, Wyo., secretary.

DEATHS

Star indicates member of AVMA

★**Tom Evans** (COL '28), 50, Albuquerque, N.M., died Feb. 28, 1959, from a heart ailment. Born July 22, 1908, at Coal Creek, Colo., Dr. Evans received his preliminary education at Florence High School before enrolling at Colorado State.

After graduation, he practiced in Oklahoma and Colorado before moving to Albuquerque, N.M., where he established the Evans Animal Hospital. Entering the service in 1941, Dr. Evans reopened his hospital in Albuquerque upon his discharge in 1946. He continued to practice there up until his death.

Dr. Thomas Evans

An energetic and well-known general practitioner, he was active in professional affairs in New Mexico and had represented his State Veterinary Medical Association in the AVMA House of Delegates without interruption since 1946, first as alternate and since 1948, as delegate.

Dr. Evans was president of the New Mexico V.M.A. in 1948-1949 and helped organize the Albuquerque Veterinary Association in 1955, serving as president until 1958.

Forthright in his opinions and expression of them, Dr. Evans never failed to make known his beliefs on issues of importance to practicing veterinarians and the profession as a whole.

Surviving are his widow, the former Gladys Williams, whom he married in 1949, three daughters, and five grandchildren.

Jim G. Filson (ONT '38), 51, Erie, Pa., died Jan. 3, 1959. Dr. Filson spent two and a half years with the BAI, U.S.D.A., and later returned to general practice.

Gerald C. Hine (STJ '19), 68, Tracy, Calif., died of a heart attack Jan. 10, 1959. He had been a federal meat inspector.

Roger Davies Hyde (COR '08), 76, Dade City, Fla., died at his home, after a long illness, on Feb. 14, 1959.

A native of Ithaca, N.Y., Dr. Hyde was employed by the federal government in meat inspection for 42 years. His work included control of foot-and-mouth disease and many years of inspection service on the Canadian border. He retired eight years ago and moved to Dade City.

F. P. Jones, 92, Fairview, Okla., died Jan. 5, 1959. Dr. Jones, was still in practice at the time of his death.

★**Will J. Miller**, 74, Topeka, Kan., an honorary AVMA member and former state livestock sanitary commissioner of Kansas, died March 10, 1959, after a prolonged illness.

Born at Osage City, Kan., in 1884, Mr. Miller graduated from Kansas University in 1908. He was livestock sanitary commissioner from 1938 until 1949 and in 1942 was elected president of the National Assembly of Chief Livestock Sanitary Officials.

In 1944, he was proposed for and unanimously elected to honorary AVMA membership in recognition of his tireless and successful efforts in obtaining congressional approval of appropriations for the upward reclassification of federal veterinarians and their salaries.

Mr. Miller is survived by his widow, a son, Will J. Miller, Jr., a sister, two brothers, and three grandchildren.

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by S. Lester Jackson. *Vet. Med.*, 49: 260 (June) 1954.

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by Margaret Schlichting. *Vet. Med.*, 51: 280 (June) 1956.

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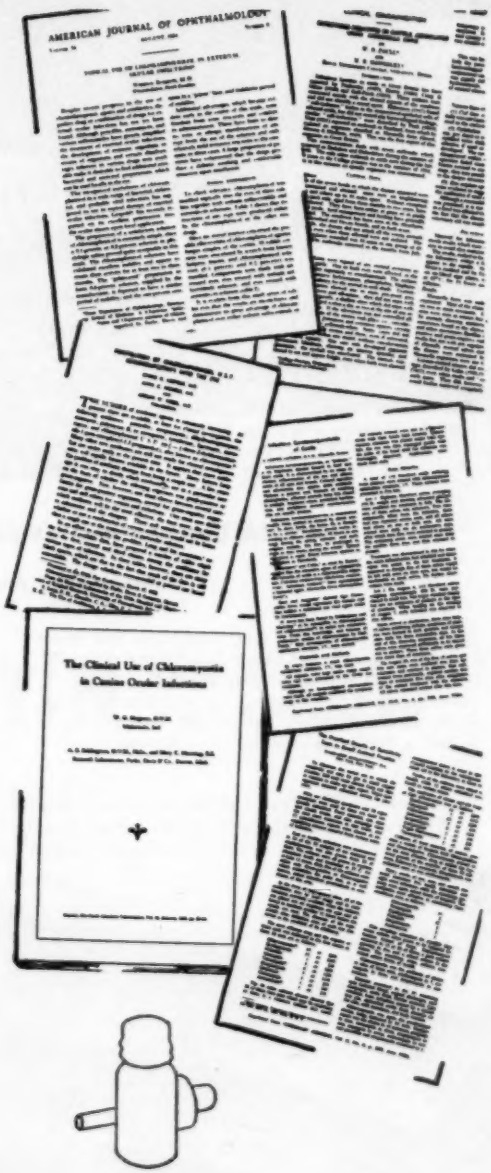

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AVMA Convention—Pan American Congress

Kansas City, August 23-27

A varied program of sports activities and other entertainment is being planned for those who will attend the AVMA convention in Kansas City.

For baseball fans, there is a schedule of home games, including night games, on August 25 and 26, and a double header, Sunday, August 23.

The municipal stadium is the home of the Kansas City Athletics, of the American League. On August 23, the Athletics will play a doubleheader with the Washington Senators in a game beginning at 1:30 p.m. The Baltimore Orioles begin a new night series August 24, which continues

Rebuilt in 90 days to serve as a new home for the Kansas City Athletics, the Municipal Stadium will be the site of American League baseball games every day of the AVMA-Pan American joint meeting.

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REFERENCES: 1. Mosier, J. E., and Coles, E. H.: Vet. Med. 53:649 (Dec.) 1958. 2. Belloff, G. B. Calif. Vet. 9:27 (Sept.-Oct.) 1956. 3. Mosier, J. E.: Vet. Med. 52:445 (Sept.) 1957.

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COMING MEETINGS

Notices of coming meetings must be received 30 days before date of publication.

Florida, University of. Second conference for veterinarians. J. Hillis Miller Health Center, University of Florida, Gainesville, May 2-3, 1959. W. R. Pritchard, program chairman.

Eastern Iowa Veterinary Medical Association. Twenty-fifth annual practitioners' all-day clinic, May 5, 1959. Hawkeye Downs, Cedar Rapids, Iowa. C. B. Thayer, Medical College, State University of Iowa, secretary.

Wisconsin Veterinary Medical Association. Regional conference on nitrofurans. Hotel Loraine, Madison, Wis., May 28, 1959. For information, contact Dr. H. J. O'Connell, Wisconsin V.M.A., 1215 Vilas Ave., Madison 5, Wis.

Kansas Veterinary Medical Association. Twenty-first annual conference. School of Veterinary Medicine, Kansas State College, Manhattan, May 31 (evening) to June 2, 1959. M. W. Osburn, 1525 Humboldt, Manhattan, secretary-treasurer.

Texas, A. & M. College of. Twelfth annual conference. School of Veterinary Medicine, A. & M. College of Texas, College Station, June 4-5, 1959. R. D. Turk, chairman.

Georgia Veterinary Medical Association. Annual meeting. Jekyll Hotel, Jekyll Island, Ga., June 15-16, 1959. A M. Mills, 325 Pinecrest Dr., Athens, Ga., secretary.

Illinois, University of. Fourth Biennial Symposium on Animal Reproduction. University of Illinois, Urbana, June 18-20, 1959. Address P. J. Dziuk, 111 Animal Genetics, University of Illinois, Urbana, for further information.

South Carolina Association of Veterinarians. Annual summer meeting. Clemson House, Clemson, S. Car., June 18-20, 1959. B. C. McLean, 808 Linden St., Aiken, S. Car., program chairman.

California Veterinary Medical Association. Seventy-first annual meeting. Miramar Hotel, Santa Monica, Calif., June 21-23, 1959. Chas. S. Travers, 3004 16th St., San Francisco, executive secretary.

Maritime Veterinary Associations, joint conference. Mount Allison University, Sackville, New Brunswick, June 23-25, 1959. P. D. McKercher, Box 310, Sackville, general chairman.

North Carolina Veterinary Medical Association. Fifty-eighth annual summer meeting. Morehead Biltmore Hotel, Morehead City, June 23-25, 1959. J. T. Dixon, secretary-treasurer.

Kentucky Veterinary Medical Association. Forty-eighth annual convention. Sheraton-Seelbach Hotel, Louisville, Ky., July 13-14, 1959. L. S. Shirrell, 545 East Main St., Frankfort, secretary.

Ninety-Sixth Annual Meeting, American Veterinary Medical Association, and Third Pan American Congress of Veterinary Medicine. Joint meeting. Kansas City, Mo., Aug. 23-27, 1959. H. E. Kingman, Jr., executive-secretary, AVMA, 600 S. Michigan Ave., Chicago 5, Ill. B. D. Blood, secretary-general, Directing Council, Pan American Congress of Veterinary Medicine, P.O. Box 99, Azul, F.C.N.G.R., Argentina, S.A.

Foreign Meetings

Veterinary Symposium in Israel (with International Farmers Convention); Veterinary Institute, Beit-Dagan, Israel, May 10-12, 1959. Dr. A. Kimron, Veterinary Institute, director. (Particulars are also obtainable from Dr. H. E. Newman, American Veterinarians for Israel, Box 143, Merrifield, Va.

International Veterinary Congress. Sixteenth session. Madrid, Spain, May 21-27, 1959. Prof. Pedro Carda A., general secretary, Calle Villanueva 11, Madrid.

U.S. COMMITTEE: Dr. W. A. Hagan, chairman, New York State Veterinary College, Ithaca, N. Y.; Dr. J. G. Hardenbergh, secretary, 600 S. Michigan Ave., Chicago 5, Ill.

Third World Congress on Fertility and Sterility. Amsterdam, Holland, June 7-13, 1959. Dr. L. I. Swaab, Sint Agnietenstraat 4, Amsterdam, Holland, honorary secretary.

APPLICATIONS

Applicants Not Members of Constituent Associations

In accordance with paragraph (c) of Section 1, Article I, of the Bylaws, the names of applicants who are not members of constituent associations shall be published in the JOURNAL. Written comments received by the Executive Secretary from any active member regarding the application as published, will be furnished to the Judicial Council for its consideration prior to acceptance of the application.

EHRLICH, DAVID X.
Quartermaster Food and Container Institute, Armed Forces, 1819 West Pershing Rd., Chicago 9, Ill.
D.V.M., Cornell University, 1935.
Vouchers: Elmer W. Young and W. E. Jennings.

SHAY, WARREN J.
105th Medical Detachment, APO 122, New York, N.Y.
D.V.M., Colorado State University, 1945.
Vouchers: W. G. Brooks and C. W. Betzold.

SINGLETARY, CHARLIE T.
P.O. Box 346, Stockton, Calif.
D.V.M. Texas A. & M. College, 1947.
Vouchers: John Wiley and J. Guthrie Blue.

Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Medical Association, the first Thursday of each month. James L. Chambers, 4307 Normanbridge Rd., Montgomery, Ala., secretary-treasurer.

Jefferson County Veterinary Medical Association, the second Thursday of each month. Dan P. Griswold, Jr., 714 S. 39th St., Birmingham, secretary.

Mobile-Baldwin Counties Veterinary Medical Association, the third Tuesday of each month. W. David Gross, 771 Holcombe Ave., Mobile, Ala., secretary.

North Alabama Veterinary Medical Association, the second Thursday of November, January, March, May, July, and September, in Decatur, Ala. Ray A. Ashwander, P.O. Box 1767, Decatur, Ala., secretary.

Northeast Alabama Veterinary Medical Association, the second Tuesday of every other month. Leonard J. Hill, P.O. Box 761, Gadsden, Ala., secretary-treasurer.

ARIZONA—Central Arizona Veterinary Medical Association, the second Tuesday of each month. J. W. Langley, Jr., P.O. Box 5013, Phoenix, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. Gwyn Chapin, 2215 E. Calle Vista, Tuscon, Ariz., secretary.

ARKANSAS—Pulaski County Veterinary Medical Society, the second Tuesday of each month. Harvie R. Ellis, 54 Belmont Drive, Little Rock, Ark., secretary-treasurer.

CALIFORNIA—Alameda-Contra Costa Veterinary Medical Association, the fourth Wednesday of Jan., March, May, June, Aug., Oct., and Nov. John S. Blackard, 420 Appian Way, Richmond, Calif., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of February, April, July, September, and December. Herb Warren, 3004 16th St., San Francisco, Calif., executive secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Paul S. Chaffee, 2333 McKinley Ave., Fresno, Calif., secretary.

Humboldt-Del Norte Counties Veterinary Medical Association, the second Tuesday of January, May, September, and November. Dr. C. A. Lamb, 2835 Dolbeer St., Eureka, Calif., secretary.

Kern County Veterinary Medical Association, the first Thursday evening of the month. James L. Frederickson, 17 Nile St., Bakersfield, Calif., secretary-treasurer.

Mid-Coast Veterinary Medical Association, the first Thursday of each month. William P. Matulich, P. O. Box 121, San Luis Obispo, Calif., secretary-treasurer.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. V. Todorovic, 47 Mann Ave., Watsonville, Calif., secretary.

Northern California Association of Veterinarians, the second Tuesday of the month. Andrew F. Giambroni, P.O. Box 782, Red Bluff, Calif., secretary.

(Continued on adv. p. 33)

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	1000 "	**500.00**
100cc Pfizer Procaine Penicillin Aqueous suspension 300,000 units per cc	**1 Vial**	**2.70**
	5 Vials	**12.50**
expires January 1961	**10 Vials**	**24.00**
	100 Vials	**230.00**
10cc Dihydrostreptomycin Solution — ½ gm. per cc	**10 Vials**	**5.70**
Expires January 1962	**100 "**	**52.00**
	1000 "	**480.00**
100cc Pfizer combiotic	**1 Vial**	**4.95**
expires January 1962	**5 Vials**	**23.00**
	10 Vials	**42.50**
	100 Vials	**400.00**
Penicillin Tablets — Soluble — 100,000 Units	**100**	**1.35**
	1000	**12.00**
	5000	**53.00**
Penicillin Tablets — Soluble — 200,000 Units	**100**	**2.40**
	1000	**21.50**
	5000	**100.00**
Penicillin with Triple Sulfas — 300,000 Units	**100**	**4.00**
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100 Chloromycetin Capsules	**100 mg**	**13.25**
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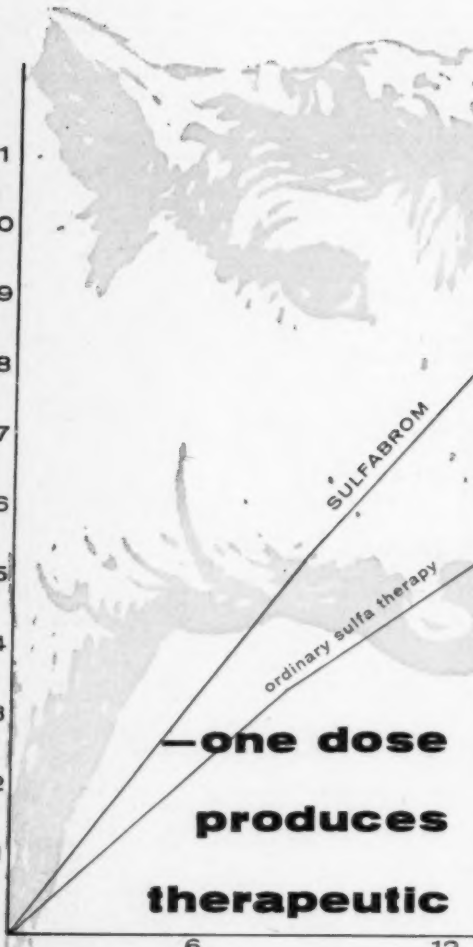

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Although SULFABROM is notable for producing effective levels in rapid time, once it has entered the blood stream its speed of action slows down considerably. SULFABROM is excreted very slowly; this accounts for its long-lasting effect. In cattle, detectable amounts may be present in the urine for as long as six days. Blood levels remain high, sometimes for as long as 53 to 60 hours. And, because it is excreted so slowly, seldom is the amount of SULFABROM passing through the urinary tract ever large enough to cause crystalluria.

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foot rot "in 48 hours the cow was able to stand and started to eat";
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as well as *scours*, winter dysentery, coccidiosis, shipping fever, listereilosis and miscellaneous infectious conditions, such as peritonitis and infected wounds.

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In sum, SULFABROM represents the very latest advance in sulfa therapy. Effective against a full range of infectious diseases, economical to use by any standards, SULFABROM is your answer to the pressing problem of repeat calls and handling time in the treatment of almost any infection.

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SULFABROM 4 Gm. Boluses—packages of 5 and 50

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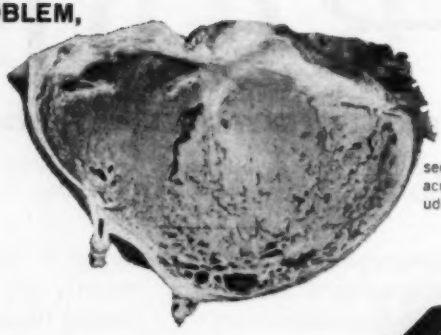

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North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell, in Modesto, Calif. T. J. Carleton, 325 W. Lockeford St., Lodi, Calif., secretary-treasurer.

Orange Belt Veterinary Medical Association, the second Monday of each month. R. Y. Foos, P.O. Box 955, Victorville, Calif., secretary-treasurer.

Orange County Veterinary Medical Association, the third Thursday of each month. H. M. Stanton, 1122 S.E. U.S. Highway 101, Tustin, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of the month. R. M. Grandfield, 416 Stephens Rd., San Mateo, Calif., secretary-treasurer.

Redwood Empire Veterinary Medical Association, the third Thursday of the month. R. R. Rediske, 833 Vallejo Ave., Novato, Calif., secretary-treasurer.

Sacramento Valley Veterinary Medical Association, the second Wednesday of the month. E. C. Story, 4819 "V" St., Sacramento 17, Calif., secretary-treasurer.

San Diego County Veterinary Medical Association, the fourth Tuesday of the month. Robert F. Burns, 7572 North Ave., Lemon Grove, Calif., secretary-treasurer.

San Fernando Valley Chapter SCVMA, the second Tuesday of each month at 7:30 p.m., Hody's Restaurant, North Hollywood, Calif. Dr. V. H. Austin, 14931 Oxnard St., Van Nuys, secretary-treasurer.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at the Casa Escobar Restaurant in Studio City. John Chudacoff, 7912 Sepulveda Blvd., Van Nuys, Calif., secretary.

Santa Barbara-Ventura Counties Veterinary Medical Association, every three months, no set date. Gerald M. Clark, 5415 8th St., Carpinteria, Calif., secretary-treasurer.

Santa Clara Valley Veterinary Medical Association, the last Tuesday of the month. Robert L. King, 1269 Grant St., Santa Clara, Calif., secretary-treasurer.

Southern California Veterinary Medical Association, the third Wednesday of the month. Mr. Don Mahan, executive secretary.

COLORADO—Denver Area Veterinary Medical Society, the fourth Tuesday of every month. Gene M. Bierhaus, 2896 S. Federal Blvd., Englewood, Colo., secretary-treasurer.

Northern Colorado Veterinary Medical Society, the first Wednesday of each month, in Fort Collins. Dr. James Voss, Veterinary Hospital, Colorado State University, Fort Collins, Colo., secretary.

DELAWARE—New Castle County Veterinary Medical Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. A. P. Mayer, Jr., R.F.D. 2, Newark, Del., secretary-treasurer.

DISTRICT OF COLUMBIA—District of Columbia Veterinary Medical Association, the second Tuesday evenings of January, March, May, and October. R. B. Gochenour, 10109 Ashwood Dr., Kensington, Md., secretary-treasurer.

FLORIDA—Big Bend Veterinary Medical Association, meets the first Sunday of each month at 5:00 p. m., at the Tallahassee Dining Room, Tallahassee. C. Paul Vickers, P.O. Box 309, Tallahassee, secretary.

Central Florida Veterinary Medical Association, the first Friday of each month at 8:00 p. m., place specified monthly. L. R. Poe, 753 W. Fairbanks Ave., Winter Park, Fla., secretary-treasurer.

Florida West Coast Veterinary Medical Association, the second Wednesday of each month at the Lighthouse Inn, St. Petersburg. Fred Jones, 3606 S. Dale Mabry, Tampa, Fla., secretary.

Jacksonville Veterinary Medical Association, the first Thursday of every month. Dodson's Restaurant, Stephen C. Hite, 5807 105th St., Jacksonville 10, Fla., secretary.

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Many persistent and recurring infections of the external ear and ear canal ("chronic ears") are often attributed to bacteria, or other agents, when in reality the etiologic organism is mycotic. Mycostatin is the only antibiotic specific against *Candida albicans* (monilia) — one of the principal causes of "chronic ears." Previously hard-to-treat dermatomycoses usually respond promptly and monial lesions usually improve 48 to 72 hours after therapy has been initiated.

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Northwest Florida Veterinary Medical Society, third Wednesday of each month, time and place specified monthly. John Webb, P.O. Box 183, Cantonment, Fla., secretary-treasurer.

Palm Beach Veterinary Society, the last Thursday of each month in the county office building at 810 Datura St., West Palm Beach. B. W. Bigger, 2833 S. 4th St., Fort Pierce, Fla., secretary.

Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. John S. Haromy, Route #1, Box 107-A, Lake Wales, Fla., secretary.

South Florida Veterinary Society, the third Wednesday of each month. Time and place specified monthly. Joe B. O'Quinn, 1690 E. 4th, Hialeah, Fla., secretary.

Suwannee Valley Veterinary Association, the fourth Tuesday of each month, Hotel Thomas, Gainesville. G. L. Burch, P.O. Box 405, Ocala, Fla., secretary-treasurer.

Volusia County Veterinary Medical Association, the fourth Thursday of each month. Robert E. Cope, 127 E. Mason, Daytona Beach, Fla., secretary.

GEORGIA—Atlanta Veterinary Medical Society, the third Thursday of each month at the Elk's Home, 726 Peachtree St., Atlanta. Clare L. Bromley, 634 Northside Dr., N.W., Atlanta, Ga., secretary.

Georgia-Carolina Veterinary Medical Association, the second Monday of each month at 8:00 p.m., at the Town Tavern, Augusta, Ga. J. A. Schmitz, 1711 Gwinnett St., Augusta, Ga., secretary.

North Georgia Veterinary Medical Association, quarterly, no set date, the spring meeting at the Veterinary School, Athens, Ga. S. J. Shirley, Commerce, Ga., secretary.

Southeast Georgia Veterinary Medical Association, quarterly, date and meeting place varies. Hugh F. Arundel, P.O. Box 153, Statesboro, Ga., secretary.

South Georgia Veterinary Medical Association, the second Sunday of each quarter at 3:30 p.m., at the Radium Springs Hotel, Albany, Ga. M. W. Hale, Route 2, Tifton, Ga., secretary.

ILLINOIS—Central Illinois Veterinary Medical Association, June 9, Sept. 9, and Dec. 10, 1959. Paul B. Doby, 4 Owens Lane, Springfield, secretary.

Chicago Veterinary Medical Association, the second Tuesday of each month, Charles H. Armstrong, 1021 Davis St., Evanston, secretary.

INDIANA—Central Indiana Veterinary Medical Association, the second Wednesday of each month. P. T. Parker, 224 N. Mill St., secretary-treasurer.

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Michiana Veterinary Medical Association, the second Thursday of every month except July and December, at the Hotel LaSalle, South Bend, Ind. Stanton Williamson, 217 W. Chippewa St., South Bend, Ind., secretary.

Tenth District Veterinary Medical Association, the third Thursday of each month. J. S. Baker, P.O. Box 52, Pendleton, Ind., secretary.

IOWA—Cedar Valley Veterinary Medical Association, the second Monday of each month, except January, July, August, and October in Black's Tea Room, Waterloo, Iowa. A. J. Cotten, P.O. Box 183, Grundy Center, secretary.

Central Iowa Veterinary Medical Association, the third Monday of each month, except June, July, and August, at 6:30 p.m., Breeze House, Ankeny, Iowa. John Herrick, 202 S. Hazel Ave., Ames, secretary.

Coon Valley Veterinary Medical Association, the second Wednesday of each month, September through May, at 7:30 p.m., Cobblestone Inn, Storm Lake, Iowa. Robert McCutcheon, Holstein, secretary.

East Central Iowa Veterinary Medical Society, the Second Thursday of each month at 6:30 p.m., usually in Cedar Rapids, Iowa. T. F. Bartley, P.O. Box 454, Cedar Rapids, secretary.

Fayette County Veterinary Medical Association, the third Thursday of each month at 6:30 p.m. in West Union, Iowa. H. J. Morgan, West Union, secretary.

Lakes Veterinary Association, the first Tuesday of each month, September through May, at 6:30 p.m., at the Gardson Hotel, Estherville, Iowa. Barry Barnes, P.O. Box 162, Milford, secretary.

North Central Iowa Veterinary Medical Association, the third Thursday of April, at the Warden Hotel, Fort Dodge, Iowa. H. Engelbrecht, P. O. Box 797, Fort Dodge, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Winneslick Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northwest Iowa Veterinary Medical Association, the second Tuesday of February, May, September, and December, at the Community Bldg., Sheldon. W. Ver Meer Hull, secretary.

Southeastern Iowa Veterinary Association, the first Tuesday of each month at Mt. Pleasant, Iowa. Warren Kilpatrick, Mediapolis, secretary.

Southwestern Iowa Veterinary Medical Association, the first Tuesday of April and October, Hotel Chieftain, Council Bluffs, Iowa. J. P. Stream, 202 S. Stone St., Creston, secretary.

Upper Iowa Veterinary Medical Association, the third Tuesday of each month at 7:00 p.m., at All Vets Center, Clear Lake, Iowa. W. A. Danker, Dows, Iowa, secretary.

KENTUCKY—Central Kentucky Veterinary Medical Association, the first Wednesday of each month. R. H. Folsom, P.O. Box 323, Danville, Ky., secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday of each month in Louisville or within a radius of 50 miles, except January, May, and July. G. R. Comfort, 2102 Reynolds Lane, Louisville, Ky., secretary-treasurer.

MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m., at the

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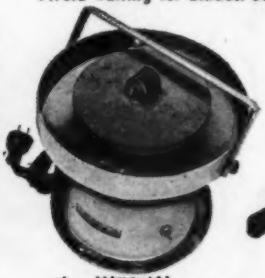

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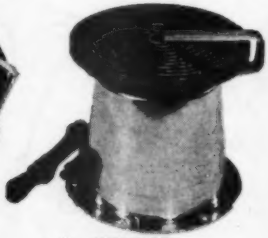

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Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Leonard D. Krinsky, 6111 Hartford Rd., Baltimore, Md., secretary.

MICHIGAN—Central Michigan Veterinary Medical Association, the first Wednesday of every month at 7 p.m. Jerry Fries, 2070 E. Main St., Owosso, Mich., secretary.

Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert W. Acton, 4110 Spring Rd., Jackson, Mich.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. Alvin R. Conquest, P.O. Box 514, Grand Blanc, Mich., secretary.

Southeastern Michigan Veterinary Medical Association, the fourth Wednesday of every month, September through May. Louis J. Rossoni, 24531 Princeton Ave., Dearborn 8, Mich., secretary.

MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of each month (except July and August), at the Coronado Hotel, Lindell Blvd. and Spring Ave., St. Louis, Mo., at 8 p.m. Edwin E. Epstein, 4877 Natural Bridge Ave., St. Louis 15, Mo., secretary.

Kansas City Veterinary Medical Association and Kansas City Small Animal Hospital Association, the third Thursday of each month at the Hotel President, Kansas City, Mo. Robert E. Guilfoil, 18 N. 2nd St., Kansas City 18, Kan., secretary.

NEVADA—Western Nevada Veterinary Society, the first Tuesday of each month. Paul S. Silva, 1170 Airport Road, Reno, Nev., secretary.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, R.D. 1, Box 284A, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April, except December, at the Irvington House, 925 Springfield Ave., Irvington, N.J. Bernard M. Weiner, 787 Clinton Ave., Newark, N.J., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Elks Club, Hackensack. James R. Tanzola, Upper Saddle River, N.J., secretary.

Northwest Jersey Veterinary Society, the third Wednesday of every odd month. G. L. Smith, P.O. Box 938, Trenton, N.J., secretary.

South New Jersey Veterinary Medical Association, the fourth Tuesday of each month at the Collmont Diner, Collingswood, N.J. Marvin Rothman, 718 Dwight Ave., Collingswood, N.J., secretary.

NEW MEXICO—Bernalillo County Veterinary Practitioners Association, third Wednesday of each month, Fez Club, Albuquerque, N.M. Jack Ambrose, 3018 N. Rio Grande Blvd., Albuquerque, secretary-treasurer.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel, Greensboro. C. G. Sims, 2450 Battleground Ave., Greensboro, N. Car., secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month, time and place specified monthly. Byron H. Brow, Box 453, Goldsboro, N. Car., secretary.

Piedmont Veterinary Medical Association, the last Friday of each month. J. G. Martin, Boone, N. Car., secretary.

Twin Carolinas Veterinary Medical Association, the third Friday of each month at Orange Bowl Restaurant, Rockingham, N. Car., at 7:30 p.m. J. E. Currie, 690 N. Leak St., Southern Pines, N. Car., secretary.

Western North Carolina Veterinary Medical Association, the second Thursday of every month at 7:00 p.m. in the George Vanderbilt Hotel, Asheville, N. Car. Viiu Lind, 346 State St., Marion, N. Car., secretary.

OHIO—Cincinnati Veterinary Medical Association, the third Tuesday of every month at Shuller's Wigwam,

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Columbus Academy of Veterinary Medicine, every month, September through May. E. M. Simonson, 3120 Valley View Dr., Columbus, Ohio, secretary-treasurer.

Cuyahoga County Veterinary Medical Association, the first Wednesday in September, October, December, February, March, April and May, at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. F. A. Coy, 8208 Carnegie Ave., Cleveland, Ohio, secretary.

Dayton Veterinary Medical Association, the third Tuesday of every month. O. W. Fallang, 6941 Far Hills Ave., Dayton, secretary.

Killbuck Valley Veterinary Medical Association, the first Wednesday of alternate months beginning with February. C. Gale, Wooster, Ohio, secretary-treasurer.

Mahoning County Veterinary Medical Association, the Fourth Tuesday of each month, at 9:00 p.m., Youngstown Maennerchor Club, Youngstown, Ohio. Sam Segall, 2935 Glenwood Ave., Youngstown, secretary.

Miami Valley Veterinary Medical Association, the first Wednesday of December, March, June, and September. J. M. Westfall, Greenville, Ohio, secretary-treasurer.

North Central Ohio Veterinary Medical Association, the last Wednesday of each month except during the summer. R. W. McClung, Tiffin, Ohio, secretary-treasurer.

Northwestern Ohio Veterinary Medical Association, the last Wednesday of March and July. C. S. Alvanos, 1683 W. Bancroft St., Toledo, Ohio, secretary-treasurer.

Stark County Veterinary Medical Association, the second Tuesday of every month, at McBrides Emerald Lounge, Canton, Ohio. M. L. Willen, 4423 Tuscarawas St., Canton, Ohio, secretary.

Summit County Veterinary Medical Association, the last Tuesday of every month (except June, July, and August), at the Mayflower Hotel, Akron, Ohio. M. L. Scott, 42 W. Market St., Akron, Ohio, secretary-treasurer.

Tri-County Veterinary Medical Association, the fourth Wednesday of January, May, and September. Mrs. R. Slusher, Mason, Ohio, secretary-treasurer.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month, 7:30 p.m., Patrick's Foods Cafe, 1016 N.W. 23rd St., Oklahoma City. Claude A. Tigert, 3032 N.W. 68th St., Oklahoma City, Okla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month in Directors' Parlor of the Brookside State Bank, Tulsa, Okla. Arlen D. Hill, 5302 E. 11th St., Tulsa, Okla., secretary.

Tulsa Association of Small Animal Veterinarians, first and third Mondays, City-County Health Dept. T. E. Messler, 3104 E. 51st St., Tulsa, Okla., secretary.

OREGON—Portland Veterinary Medical Association, the second Tuesday of each month, at 7:30 p.m. Ireland's Restaurant, Lloyds, 718 N.E. 12th Ave., Portland. Donald L. Moyer, 8415 S.E. McLoughlin Blvd., Portland 2, Ore., secretary.

Willamette Veterinary Medical Association, the third Tuesday of each month, except July and August, at the Marion Hotel, Salem. Robert J. Mallorie, P.O. Box 155, Silverton, Ore., secretary.

PENNSYLVANIA—Keystone Veterinary Medical Association, the fourth Wednesday of each month at the Uni-

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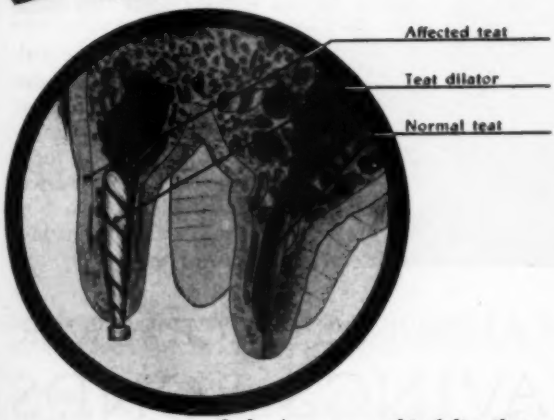

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versity of Pennsylvania School of Veterinary Medicine. Raymond C. Snyder, N.E. Corner 47th St. and Hazel Ave., Philadelphia 43, Pa., secretary.

Lehigh Valley Veterinary Medical Association, the first Thursday of each month. Stewart Rockwell, 10th and Chestnut Sts., Emmaus, Pa., secretary.

Pennsylvania Northern Tier Veterinary Medical Association, the third Wednesday of each odd numbered month. R. L. Michel, Troy, Pa., secretary.

SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

Georgia-Carolina Veterinary Medical Association—see GEORGIA.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. Jack E. Habluetzel, Route 1, Box 65-N, Ingleside, Texas, secretary.

Dallas County Veterinary Medical Association, the first Tuesday of each month at 7:30 p.m., at a place to be specified. Frank N. Black, 12830 Preston Rd., Dallas, Texas, corresponding secretary.

VIRGINIA—Central Virginia Veterinary Association, the second Thursday of each month at 8:00 p. m., except July and August, at a place in Richmond to be announced monthly. Edwin M. Crawford, secretary-treasurer.

Northern Virginia Veterinary Conference Association, the second Tuesday of each month. T. P. Koudelka, P.O. Box 694, Harrisonburg, Va., secretary.

Northern Virginia Veterinary Society, the second Wednesday of every third month. Meeting place announced by letter. H. C. Newman, Box 145, Merrifield, secretary.

Southwestern Virginia Veterinary Medical Association, the first Thursday of each month. D. F. Watson, Blacksburg, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Monday of each month, Magnolia American Legion Hall, 2870 32nd W., Seattle. Roy C. Toole, 10415 Main St., Bellevue, secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. B. D. Benedictson, 3712 Plummer St., Olympia, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the third Thursday of each month in the Hotel Pritchard, Huntington, W. Va., at

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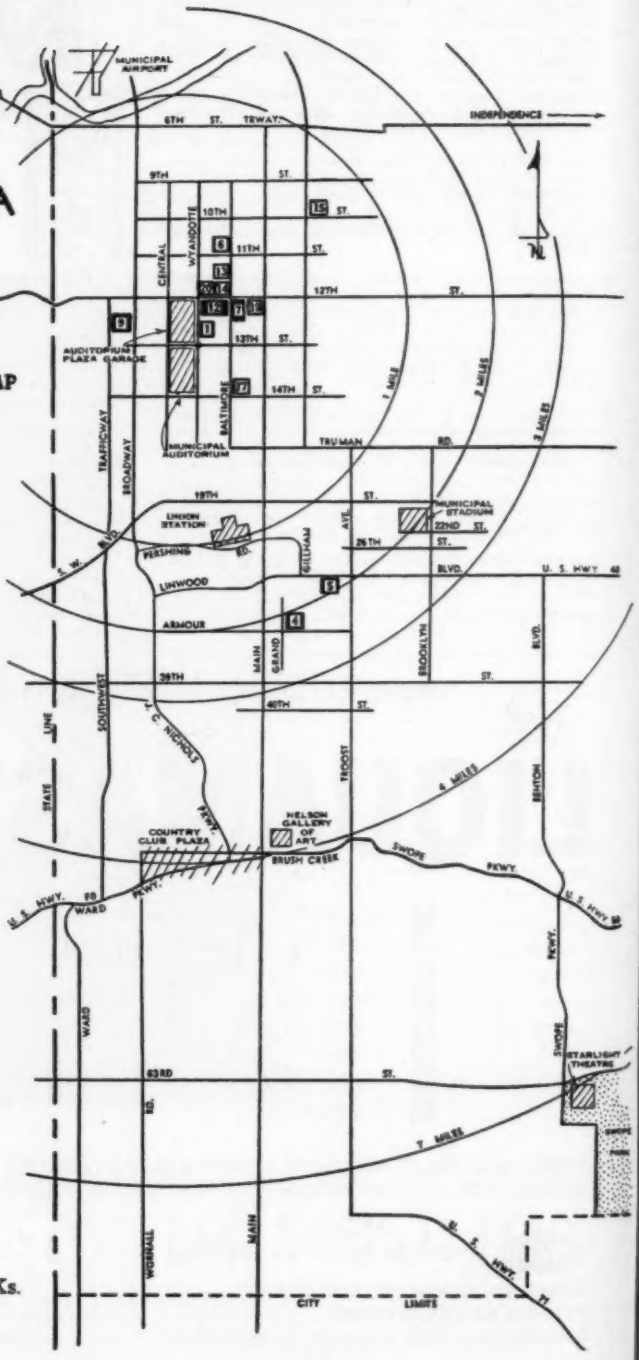
Map of the GREATER KANSAS CITY AREA

ALL HOTELS NOT IN WALKING DISTANCE OF MUNICIPAL AUDITORIUM ARE WITHIN 10 MINUTES BY PUBLIC TRANSPORTATION

HOTEL LIST AND DOWNTOWN MAP

NO.	HOTEL
1	Aladdin, 1213 Wyandotte
4	Bellerive, 214 East Armour Blvd.
5	Berkshire, 1021 E. Linwood
6	Continental, 11th & Baltimore
7	Dixon, 12th & Baltimore
9	Kansas Citian, 1216 Broadway
12	Muehlebach, 12th & Baltimore
13	New Yorker, 1114 Baltimore
14	Phillips, 12th & Baltimore
15	Pickwick, 10th & McGee
17	President, 14th & Baltimore
19	Senator, 17 W. 12th St.
20	State, 12th & Wyandotte
21	Town House, 7th and State, Kansas City, Ks.



HOTEL INFORMATION — KANSAS CITY, MO., CONVENTION

Ninety-Sixth Annual AVMA Meeting, Aug. 23-27, 1959

All requests for hotel accommodations will be handled by a Housing Bureau in cooperation with the Committee on Local Arrangements. The Bureau will clear all requests and confirm reservations.

Hotel and Rate Schedule

Map No.	Hotel	Single	Double	Twin	Suite
1.	Aladdin*	$4.50-8.50	$ 6.50-10.50	$ 9.50-12.00	$17.00-30.00
4.	Bellerive*	5.00-9.00	8.00-12.00	9.00-13.00	From $18.00
5.	Berkshire*	5.00-7.00	7.00-10.00	8.50-10.00	From $14.00
6.	Continental*	6.50-11.00	8.50-13.50	10.00-14.00	$20.00-32.00
7.	Dixon	4.50-7.00	6.50-9.00	8.00-12.00	- - - - - - -
9.	Kansas Citian	3.50-8.00	5.50-11.00	7.00-14.00	From $10.00
12.	Muehlebach*	Headquarters Hotel — No Room Accommodations			
13.	New Yorker	5.50-12.00	8.00-14.00	9.50-14.00	$23.00
14.	Phillips*	7.50-10.50	9.50-13.00	11.50-14.00	$20.50-35.00
15.	Pickwick*	5.85-10.85	6.35-10.85	8.35-12.50	From $14.00
17.	President*	6.50-10.00	9.50-13.00	11.00-15.00	$25.00
19.	Senator	3.50-7.00	5.00-10.00	6.00-10.00	$15.00
20.	State	4.75-6.50	7.50-8.75	8.75-9.25	- - - - - - -
21.	Town House*	5.50-12.00	10.00-13.50	11.00-16.00	From $23.00

*100 per cent air-conditioned; in other hotels listed, majority of rooms air-conditioned.

FAMILY PLAN—The above hotels offer a "family plan" whereby children under 14 years of age will be accommodated in the same room with their parents at no extra charge. If more than one room is required to accommodate children, the hotel will charge only the single rate for each room.

MOTELS—Reservations for motels in the Kansas City area may be made through the Kansas City Convention and Visitors Bureau, 1030 Baltimore Ave., Third Floor, Kansas City 5, Missouri.

PLEASE USE APPLICATION ON REVERSE SIDE FOR HOTEL ACCOMMODATIONS

Application for Hotel Accommodations

1959 AVMA Convention — Kansas City, Missouri

The Convention and Visitors Bureau will make every effort to place you according to your expressed wishes, or to best advantage elsewhere if that is not possible and you desire us to do so.

Please give us the complete information requested below. At least four choices of hotels, or more if you desire, are necessary. Arrange for double occupancy of rooms wherever possible; only a limited number of single rooms is available.

Date.....

Please make hotel reservation in accordance with the following:
Accommodations desired:

Hotel.....First Choice

Hotel.....Second Choice

Hotel.....Third Choice

Hotel.....Fourth Choice

.....Room WITH bath for one person Rate per room desired $..... to $.....

.....Room WITH bath for two persons (double bed) Rate per room desired $..... to $.....

.....Room WITH bath for two persons (twin beds) Rate per room desired $..... to $.....

.....Large room WITH bath for..... persons Rate per room desired $..... to $.....

.....Suite—Parlor, ...Bedroom(s) with bath for ..... persons. Rate per suite desired $.....

Arrival date....., hour.....A. M. .....P. M.
Departure date.....

If reservation cannot be made in one of the hotels indicated shall we place you elsewhere? Yes..... No.....

Please check your mode of transportation: Car..... Train..... Plane..... Bus.....

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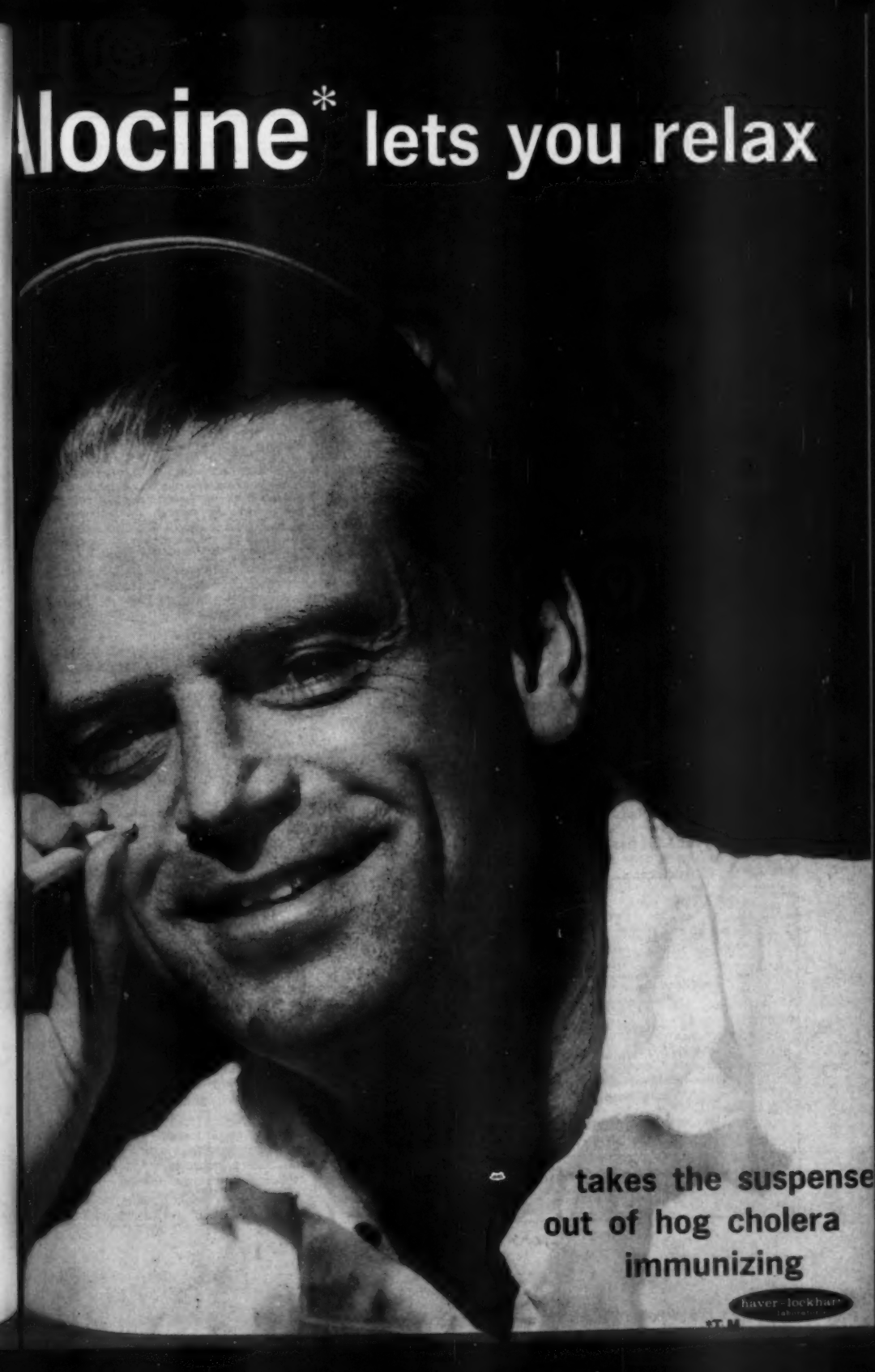
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8:30 p.m. Harry J. Fallon, 200 5th St., W. Huntington, W. Va., secretary.

WISCONSIN—Central Wisconsin Veterinary Medical Association, the second Tuesday of each quarter (March, June, Sept., Dec.) C. R. Carlson, 1109 E. LaSalle Ave., Barron, Wis., secretary.

Dane County Veterinary Medical Association, the second Thursday of each month. Dr. E. P. Pope, 409 Farley Ave., Madison, Wis., secretary.

Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. Dr. Jordan Lewis, Menomonee Falls, Wis., secretary-treasurer.

Northeastern Wisconsin Veterinary Medical Association, the third Wednesday in April. William Madson, 218 E. Washington St., Appleton, Wis., secretary.

Rock Valley Veterinary Medical Association, the first Wednesday of each month. L. C. Allenstein, 209 S. Taft St., Whitewater, Wis., secretary.

Southeastern Veterinary Medical Association, the third Thursday of each month. John R. Curtis, 419 Cook St., Portage, Wis., secretary.

Wisconsin Valley Veterinary Medical Association, the second Tuesday of every other month. John B. Fleming, 209 E. 4th St., Marshfield, Wis., secretary.

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1st of month issue — 6th of month preceding date of issue.

15th of month issue — 20th of month preceding date of issue.

Names of classified advertisers using key letters can not be supplied. Address your reply to the box number, c/o JOURNAL of the AVMA, 600 S. Michigan Ave., Chicago 5, Ill., and it will be sent to the advertiser.

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Associate veterinarian for small animal hospital in Connecticut. Excellent opportunity to develop surgical and diagnostic skills. Furnished 4-room apartment available; will consider June graduate. State experience, salary desired. Address "Box G 7, c/o JOURNAL of the AVMA.

To operate small animal hospital, salary and percentage, rent or lease, option to buy, Arizona license. Dr. M. J. Bramley, 560 S. Scottsdale Rd., Scottsdale, Ariz.

Wanted—veterinarian with California license to assist in mixed practice. Permanent position with good salary and excellent working conditions. Address Dr. F. H. Saunders, 336 E. Lafayette St., Stockton 3, Calif.

Experienced veterinarian for expanding small animal hospital in rapidly-growing area located in Phoenix area. Must be capable of management. Salary plus percentage; may lead to lease to right party. Address Scottsdale Veterinary clinic, 1102 So. Scottsdale Rd., Scottsdale, Ariz.

Wanted—veterinarian, bacteriology background, as laboratory veterinarian in regional laboratory. Social Security and state retirement, salary $6,600, available immediately. Write to P.O. Box 2821, Little Rock, Ark.

Veterinary supervisor—chief meat inspector. Salary range is $6,447 to $7,836 per year. Supervise modern municipal meat control program. Doctor of Veterinary Medicine degree required. Prefer man with supervisory experience in meat inspection work. Excellent working conditions and personnel benefits. Civil Service status. Apply to Department of Personnel, City of St. Louis, 235 Municipal Courts Building, St. Louis 3, Mo.

Veterinarian to do predominantly large animal work in mixed practice, modern hospital. Send complete resume and salary expected. Auto required. Greenfield Pet Hospital, Ottumwa, Iowa.

Veterinarian for three to four months beginning July 1 to help run modern small animal hospital near

New York City. Excellent salary. Address "Box H 3," c/o JOURNAL of the AVMA.

Wanted—middle-aged veterinarian, full or part time, to assist two veterinarians in small animal practice in Tucson. State qualifications and salary desired. Address "Box H 5," c/o JOURNAL of the AVMA.

Relief veterinarian wanted immediately to take complete charge of small animal hospital; must have Maryland license. Apartment available. State salary expected, telephone number. Address "Box H 8," c/o JOURNAL of the AVMA.

Assistant for Virginia mixed practice. State age, experience, family status, licensure, etc. in first letter. Address "Box H 9," c/o JOURNAL of the AVMA.

Small animal clinician, A.A.H.A. hospital, metropolitan Washington D.C. area. Mature person with experience and good reference desired. Starting salary $7,500 per annum. Address "Box H 11," c/o JOURNAL of the AVMA.

Veterinarian wanted for busy small animal hospital in Los Angeles area. California license and experience necessary. Eventual bonus or percentage for right party. Address "Box H 15," c/o JOURNAL of the AVMA.

Associate veterinarian wanted for two progressive practitioners; 95 per cent small animal. Missouri or reciprocal license required. Address "Box H 17," c/o JOURNAL of the AVMA.

Wanted—Positions

Relief veterinarian available, New York and New Jersey licenses, small animals only. Address D.V.M., 1007 80th St., North Bergen, N.J.

Practitioner ten years, pilot five years, having sold my practice, am seeking position combining both abilities, such as area representative for drug company. Would consider position independent of flying only if sufficiently attractive. Address "Box G 32," c/o JOURNAL of the AVMA.

Third year veterinary student desires summer job with a practitioner in the Southwest. Address "Box G 27," c/o JOURNAL of the AVMA.

German veterinarian (D.V.M.), 29, single, graduated Hannover 1956 (AVMA-recognized college), large experience, perfect English, wants assistantship in mixed or large animal practice. Address "Box H 2," c/o JOURNAL of the AVMA.

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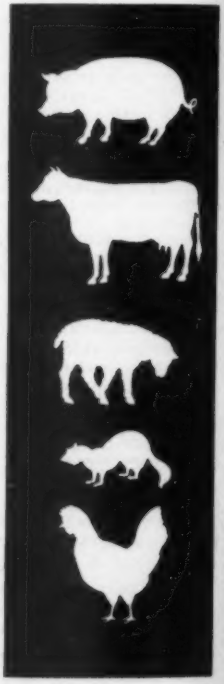

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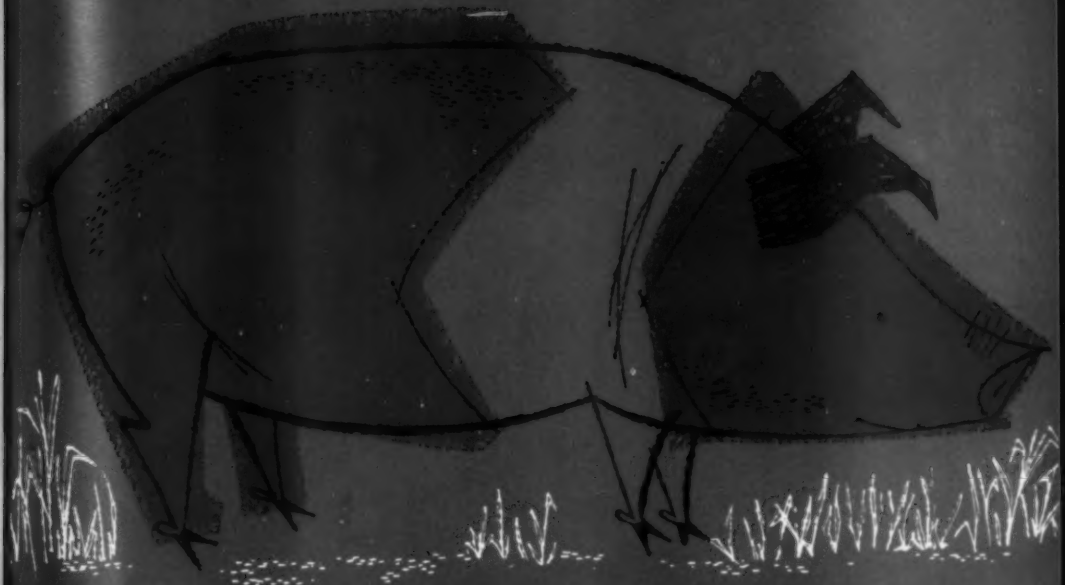

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